VOL. 173, NO. 1 AMERICAN JULY, 1950

OCT 25 1950

Gas Journal

SERIAL RECORD

©OLB 256304

PERFORMANCE STANDARDS GO UP!

This simple little ejector ring boosts pressure as demand increases

Bottom vent type optional

OTHER ADVANTAGES
Positive internal relief valve. New, large area, protected bottom vent. More capacity at low inlet pressures. Excellent lock-up characteristics. Accessible parts, easy to service.

WITH ROCKWELL EMCO Ejector SERVICE REGULATORS

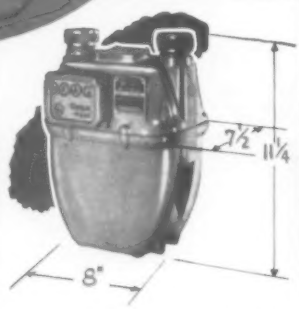
Pittsburgh Equitable Meter Division
ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pa.
Atlanta Boston Chicago Columbus Houston Kansas City
Los Angeles New York Pittsburgh San Francisco
Seattle Tulsa

NO OTHER METER

gives you so many money saving features . . . so much value and convenience

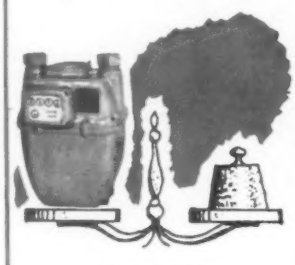
CAST ALUMINUM CASE

Defies the elements. Has high impact strength. Won't rust or corrode



COMPACT DIMENSIONS

Fits easily into tight places. Ideal for conserving space on multiple settings



LIGHT WEIGHT

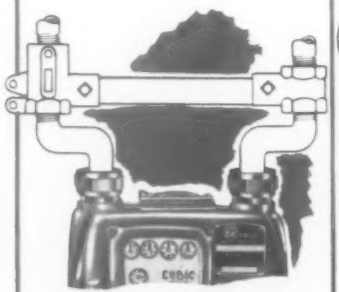
Meter weighs only 11½ lb. Saves in shipping, handling, installation costs

BOWL TYPE BODY

No troublesome side plates. Only one external gasket to seal

STEEL SPUDS

Give added strength. Threads won't gall



EASILY INTERCHANGES

With all makes through suitable connections; tin meter bars

ADJUSTMENT CONVENIENCE

Hand hole plate in cover permits easy tangent adjustment

AMPLE CAPACITY

Up to 150 cfh of 0.60 sp. gr. gas at ½ in. W.C.

ROCKWELL-EMCO NO. 00 GAS METER

with pressure cast aluminum alloy case

Pittsburgh Equitable Meter Division

ROCKWELL MANUFACTURING COMPANY

Pittsburgh 8, Pa.

Atlanta · Boston · Chicago · Cleveland · Dallas · Kansas City
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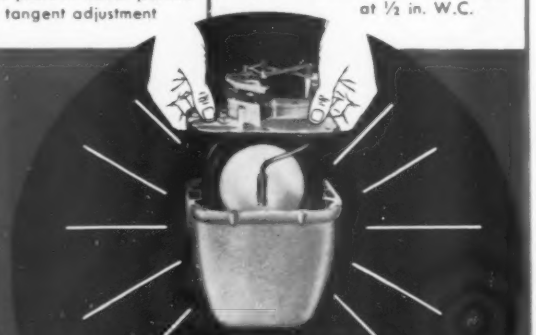

SERVICE EASE

Entire working mechanism is easily replaceable as a unit with either a new or factory rebuilt assembly in proof and ready to go

Write for Bulletin 1163

JUL 25 1950

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He's on your staff but not your payroll

It was a tough heating problem. Some dealers even ducked it. But the Bryant dealer called on a proved source of engineering aid. And the Bryant distributor brought in the answer that landed the contract.

Yes, Bryant distributors welcome such opportunities. Complete and thorough factory engineering assistance is at their call. Thus, thinking of the industry's largest staff of gas heating engineers becomes a plus value for dealers.

...r plus factors of the Bryant program ... opportunity of getting most everything ...heating equipment from a single source ...ear-by distributor with adequate ware-...stock . . . advertising co-operation that ...pay the cost of dealer localized cam- ... and backs them up with powerful ...l advertising.

...ties benefit from this Bryant dealer ...m, too. It means *better equipment* on ...ains . . . *better sold* and *better installed.*

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AMERICAN Gas Journal

205 EAST 42nd STREET

NEW YORK 17, N. Y.

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... and water boy, too!

bryant
AUTOMATIC HEATING

The most complete line of gas heating equipment in the nation

Bryant Heater, Dept. 195,
17825 St. Clair, Cleveland, Ohio

( ) Send me the new booklet that tells the Bryant story. ( ) Have your distributor call on me.

Name_____

Company_____

Address_____

City_____ State_____

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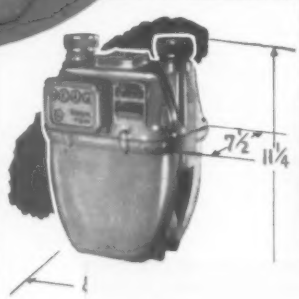

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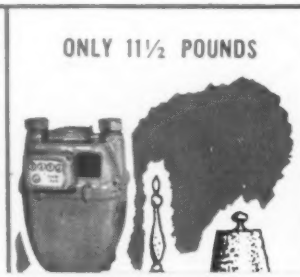

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Give added strength. Threads won't gall

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ESTABLISHED 1859

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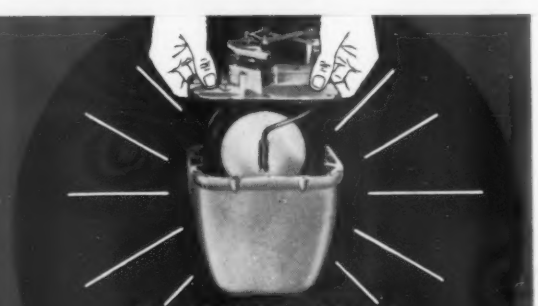
with pressure cast aluminum alloy case

Pittsburgh Equitable Meter Division

ROCKWELL MANUFACTURING COMPANY



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Other plus factors of the Bryant program are the opportunity of getting most everything in gas heating equipment from a single source . . . a near-by distributor with adequate warehouse stock . . . advertising co-operation that helps pay the cost of dealer localized campaigns and backs them up with powerful national advertising.

Utilities benefit from this Bryant dealer program, too. It means *better equipment* on your mains . . . *better sold* and *better installed.*

Let the pup be furnace man
. . . and water boy, too!

bryant

AUTOMATIC HEATING

The most complete line of gas heating equipment in the nation

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July, August & September is "Clean Sweep" Time

For extra rewards, extra sales, extra gas load—tie in with this big AGA-Servel Contest

The time is now. The dividends are big. And they're all *yours*. The great "Clean Sweep" Quarter is underway. And it's a made-to-order promotion for pepping up your retail sales . . . for stepping up your gas load.

The rewards are bigger, better than ever. Every month, special cash prizes are awarded to top salesmen. A lot more money will be divided up at the end of the contest on September 10. Then there are desk trophies . . . plaques . . . handsome personal jewelry sets . . . and, best of all, a wonderful Vacation Trip for leading salesmen and representatives from winning Gas Companies.

Everything is all set up for you. All you have to do is be sure your company and your salesmen are enrolled. And don't worry if you had to miss the earlier "Jet Freeze" Contest that marked the first half of this exciting "Big Six" Sales Campaign. You can still clean up in the "Clean Sweep" Contest. And to help you win, Servel has a raft of sales promotion aids. Details will be rushed to you. Write Servel, Inc., Evansville 20, Indiana.

Servel *The GAS Refrigerator*

where it's needed most....

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captan

the natural gas odorant

provides a constant vigilance 24 hours a day to tell you when dangerous concentrations of gas are building up . . .

WRITE, WIRE OR CALL TODAY AND LET ONE OF OUR TECHNICAL ENGINEERS GIVE YOU FULL DETAILS OF THE CHARACTERISTICS OF CAPTAN THAT MAKE IT SO DEPENDABLE.

NATURAL GAS ODORIZING CO., INC.

Without beam strength—or, for that matter—without all of the strength factors listed opposite—no pipe laid 100 years ago in *city streets* would be in service today. But, in spite of the evolution of traffic from horse-drawn vehicles to heavy trucks and buses—and today's vast complexity of subway and underground utility services—cast iron gas and water mains, laid over a century ago, are serving in the streets of more than 30 cities in the United States and Canada. Such service records prove that cast iron pipe combines all the strength factors of long life with ample margins of safety. No pipe that is provably deficient in any of these strength factors should ever be laid in city streets. Cast Iron Pipe Research Association, Thos. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3.

CAST IRON PIPE

Strength factors of Long Life !

No pipe that is provably deficient in any of these strength factors should ever be laid in city streets

BEAM STRENGTH

When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

CRUSHING STRENGTH

The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

SHOCK STRENGTH

The toughness of cast iron pipe which enables it to withstand impact and traffic shocks, as well as the hazards in handling, is demonstrated by the Impact Test. While under hydrostatic pressure and the heavy blows from a 50 pound hammer, standard 6-inch cast iron pipe does not crack until the hammer is dropped 6 times *on the same spot* from progressively increased heights of 6 inches.

BURSTING STRENGTH

In full length bursting tests standard 6-inch cast iron pipe withstands more than 2500 lbs. per square inch internal hydrostatic pressure, which proves ample ability to resist water-hammer or unusual working pressures.

SERVES FOR CENTURIES

Only STEWART-WARNER "SAFETY-SEALED" Units

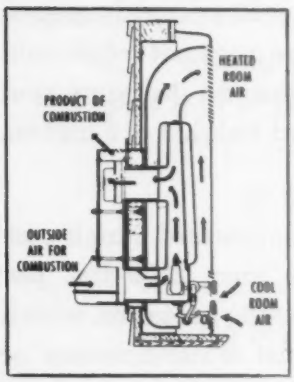
bring *all* these advantages to *Zone-Controlled* Gas Heat!

- Small, compact units applicable to one room, a suite of rooms or an entire building!
- All combustion products vented directly through a safety-sealed, exterior wall vent!
- No room air is used for combustion!
- Dependable, low-cost *zone-heating* with manual or thermostat control!
- Easily recessed into walls of wood, brick, plaster, stucco or cement-block construction!
- Rated inputs from 14,000 to 31,000 BTUs per hour!

2 model sizes assure the best possible answer for most heating requirements. Handsomely styled to suit any interior. The inside wall panel is available in Ivory, Beige or Aluminized finish.

Model 991-14 14,000 BTU/HR
18" x 24" x 4"

Model 992-20 20,000 BTU/HR
18" x 38½" x 4"



Exclusive "Safety-Sealed" design positively seals all fuel gas, flame and flue gases from contact with heated room air. "Safety-Sealed" exterior vent draws all combustion air from outdoors, vents all combustion products outside *through the wall!* Interior wall panel extends only 4 inches from the wall surface. Connects directly to the small exterior wall vent.

This "Safety-Sealed" *Saf-Aire* model, for example, is a completely independent, automatic gas heating system that provides safe, reliable heat for an entire building, remote zone, or a single hard-to-heat room.

Every room or zone is heated to its individual requirements with new convenience, comfort and economy *unattainable* with conventional-type central heating plants.

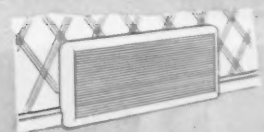
Exclusive "Safety-Sealed" construction *seals* all combustion air and products from contact with heated room air. The patented exterior wall vent draws in *outside* air for combustion, then vents all combustion products outside.

Easy to install in any exterior wall, this versatile "packaged" heating unit needs no chimney, ducts *or electricity!* Only one utility connection is required—the gas line. No basement, closet or floor space is wasted.

Now available with manual or thermostat control, Saf-Aire operates with equal dependability and silence on natural, manufactured or LP gas. Just set each unit for the desired level of heat, then forget it!

WRITE NOW for complete, free information and specifications on the complete line of Stewart-Warner "Safety-Sealed" Gas Heating Systems. Address inquiries to 1521 Drover Street, Indianapolis 7, Indiana.

These Stewart-Warner Heaters are "Safety-Sealed," Too!



SOUTH WIND ZONE HEATING SYSTEM
Easily installed in any inside or outside wall. Two suitcase-size units heat average home. Automatically modulated forced-air heat. Thermostat control.

SOUTH WIND ZONE FURNACE
Compact, forced-air unit. Easily tucked away under the floor, in a closet or any convenient space. Short ducts from centralized installation. Thermostatic control.

Approved by American Gas Association

STEWART Safety Sealed WARNER
DOMESTIC HEATING

AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 173 JULY 1950 NUMBER 1

This month...

Gas Heat, a newcomer to the gas magazine field, made its bow in June. Designed primarily for heating dealers, rather than for utilities, the new publication is intelligently planned from an editorial standpoint, and has an attractive although by no means spectacular makeup. Dealers are becoming a factor of ever increasing importance in the gas heating field, and a publication that aspires to make them better and more responsible representatives of gas should make a place for itself. We wish *Gas Heat* success.

There seems something monstrously incongruous about sweating out copy for a house heating issue of AMERICAN GAS JOURNAL when temperature and humidity in our non-conditioned editorial cell are both well above 90. But come hell or high water, September will be devoted to gas heating.

After bragging last month about the accuracy of our "Chronology of the Natural Gas Industry" (pp. 29-36 AGJ May) we were finally hauled up short by Bob Lewis of The Laclede Gas Co. in St. Louis. He observed that we covered the conversion to natural gas of most of the major cities in the country but ignored St. Louis, which went to mixed gas in 1932 and straight natural in 1949. Considering that we had a good story on the fine public relations aspect of Laclede's final conversion in the same May issue, we are a little hard put to explain the omission. Even Homer nodded; but the editorial department must have been on straight sleeping pills that day.

Just out of curiosity we ran up a quick calculation on the number of pages of reprints of JOURNAL articles that have been distributed in the past year. It comes to about a quarter of a million. That would be a page and a half for every employee of every gas company in the U. S. We trust they got proper distribution.

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Elliott Taylor · Editor

Howard F. Weeks · Associate Editor

Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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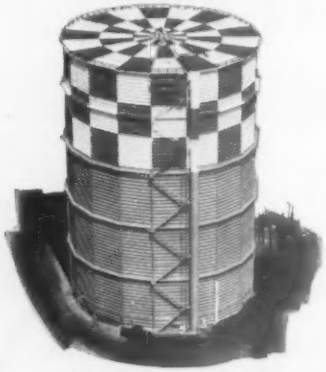
GAS HOLDERS represent a huge capital investment. Make sure you get the most for your money—specify Koppers. Only Koppers is equipped to design, engineer and fabricate *entirely within its own plant* any size Water Seal Gas Holder up to 10,000,000 c. f. And no matter how large the job, when you specify Koppers, you are assured erection will be completed well before the deadline.

In all types of gas plants from coast to coast, Koppers Water Seal Holders have earned a reputation for long life. For example, the Bartlett Hayward Company, now a part of Koppers Company, designed and built its first Water Seal Gas Holder in 1876. *It is still in active service!* The same kind of accurate engineering and rugged construction established then is built into every Koppers Water Seal Holder today.

Bulletin 101 contains full technical information and specifications. For your personal copy, write today to: KOPPERS COMPANY, INC., *Gas Apparatus Dept.*, 247 Scott St., Baltimore 3, Maryland.

KOPPERS WATERLESS GAS HOLDERS



Provide long life, low-cost gas storage. Use 1/5 smaller heating plant for winter operation. Take less ground space for equal capacity. Crown is protected at all times, no danger from snow or ice. Painting, other maintenance costs are extremely low. For complete story write for Bulletin 102.

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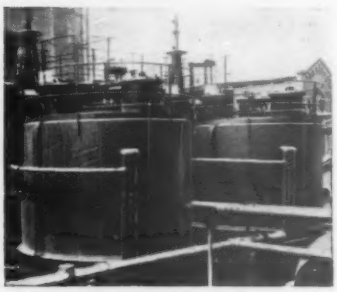

Ideal investment for gas plants to recover profitable tars, oils, by-products, carbon black, etc., and to clean blast furnace gas used in coke ovens. Efficiency guaranteed to any amount you specify. Every installation designed to your requirements, delivered under one contract. Fly Ash Precipitators for nuisance abatement also available. For full information, write, outlining your problem.

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GAS HOLDERS • ELECTROSTATIC PRECIPITATORS

Editorial:

The Servel Suit

IN layman's language the Department of Justice action filed against Servel in Philadelphia and the Federal grand jury indictment returned against the manufacturer and seven gas companies in Pittsburgh both boil down to these simple understandable facts:

1. Servel has the exclusive rights, in the United States, Cuba and Canada to all of the Swedish patents that it has been acquiring since 1927.
2. It operates through a system of distributors, whereby each is given an exclusive territory, and the distributors in turn agree not to handle competing lines of refrigerators.
3. Some distributors work through dealers who have also agreed not to handle competing lines, and who agree to sell Servel refrigerators to consumers at prices established by the distributors.

This routine step in the government's campaign of badgering business just for the political hell of it is of more than passing interest to gas companies, because the attorney general alleges that of 790 Servel distributors in the United States, approximately 680 are gas utilities.

Taking the Pittsburgh suit as a criterion, it is only realistic to assume that every one of these utilities could become a defendant in a similar action, wherever Servels are sold.

Even if few, or none, of these many potential suits materialize, the gas companies will be, in the eyes of their customers, identified with the manufacturer in the court battle that will be fought out in Philadelphia.

By the very nature of its distribution system (which incidentally is now being completely revised by Servel in an effort to expand its retail dealer outlets) the trade name has in the past been associated with the gas company in nearly every community in which the line has been sold.

We assume that Servel will enter a vigorous defense in every instance in which its reputation and business methods are brought under fire. If the justice department follows the tactics employed in the A & P suit, it will probably try the case through press releases before it ever reaches open hearings in the court. Attorney General McGrath has already made his first pass under this method, by stating that the case indicated a need "for immediate action to pry open to competition a field in which Servel has enjoyed an unchallenged monopoly for years."

Viewed through the glass of naive common sense, which attorneys for both sides in a suit generally succeed in clouding up to the point of complete opaqueness, the following points seem clear and understandable:

1. Servel does have exclusive patents, bought and sold and traded in under the international and domestic laws designed to protect those who invent new devices or who undertake to develop and market them through agreement with the inventors.

Some ideas take millions to exploit; others, at least according to Dr. Emerson, can be handled by building mouse traps in the woods, through which the world makes a beaten path to the inventor's door. We doubt if the advantages of "silent vibrationless operation" in a refrigerator would be enjoyed by millions of Americans if some Swede had barricaded himself in a log hut in the forests north of Stockholm and waited for the customers to start swamping out a trail through the spruce to buy absorption refrigerators.

2. Servel distributors, or at least many of them, have exclusive territories. It is reasonable to assume, whether by contract with the manufacturer or through the exercise of ordinary business horse sense that they would concentrate on the line that thus gave them the best competitive advantage against the innumerable other makes of refrigerators on the market.

We once were offered the exclusive representation of a brand of rabbit pellets, for Adams County, Pa., on just these terms. We passed it up, not because of our fear at the time of the department of justice, but because we didn't like tame rabbits and the wild ones were accustomed to dining *al fresco* in our family garden.

3. Some dealers also have agreed not to handle competing lines, and some sell refrigerators at the same prices model for model as are charged in neighboring cities.

In our home town you can't buy a new Plymouth from a Ford dealer. And before he walks into the showroom any prospect knows, or can easily find out, just what the car he wants is going to retail for. He also knows that the price will be the theoretical F.O.B. factory price, plus freight, the same in one showroom as it is in another. We have often marveled at the amazing repetitive pattern of this coincidence, but it just never occurred to us to regard it as a concomitant of conspiracy.

We readily concede that these ruminations will be of no help to Servel in preparing its case for the federal court. We have no preconceptions as to whether, within the law as the justice department would have it interpreted, the company will be held guilty or innocent.

But we do apprehend that as the suit pursues its way through the courts more charges will be leveled by innuendo than have been laid in the formal complaint. It is a good idea at the outset to translate the whole proceedings into the simple, contemptible, understandable terms of the average citizen.

Elliott Taylor

GRASS ROOTS Public Relations

TEXAS Gas Transmission is encouraging soil conservation on land above and adjacent to its natural gas pipe lines. The initial important job of seeding and terracing along the pipe line right-of-way is, in the eyes of the company conservation department, only the beginning of a continuing program to promote soil conservation along the entire system of 2,400 miles of pipe lines.

TEXAS GAS SOIL EXPERTS OFFER FARMERS NEW SERVICE

RIGHT-OF-WAY LAND SEEDED AND TERRACED TO SPUR CONSERVATION

Farmers in the community who have sold right-of-way to Texas Gas Transmission Corporation for the new 800-mile natural gas pipe line that passes near here receive an entirely new and valuable soil conservation service from the pipe line Company.

On each farm where the pipe line passes through, a Texas Gas crew will seed, fertilize, and where necessary . . terrace the land disturbed by pipe line construction. They use carefully prepared seed mixtures to provide temporary or permanent cover crops according to the individual farmer's wishes.

Increasing the Yield

At the same time the Company Agriculturist offers the farmer advice on methods of increasing his yield and conserving soil. He usually explains to the landowner that Texas Gas shares with him a mutual interest in preventing soil erosion, and that his Company will continue to inspect and help him care for the soil above and adjacent to the pipe line right-of-way on his land.

Texas Gas is the first company in the industry to organize a Soil Conservation Department headed by trained and experienced Agriculturists who have the material, men and equipment to do a specialized job of aiding the farmer and protecting the pipe line route from harmful erosion. Texas Gas is spending about $225,000 on the program for crews, seed and fertilizer, and equipment.

This Fall the Soil Conservation men are trying to cover as much ground as possible before cold weather closes in. Eight crews are each seeding an average of a mile a day to reach as many farmers as possible along the 800-mile line before the end of the season.

Seeding on farms that cannot be reached will be resumed in the Spring as soon as weather and season permit. The plants chosen for seeding and the fertilizer are selected to suit each locality by the Chief Soil Conservationist, J.W. Carneal, after consultation with the important local and national agricultural authorities on the best methods of conservation.

Continuing Program

The initial important job of planting and terracing right-of-way for farmers is only the beginning of a continuing program to help promote soil conservation along Texas Gas' entire system of 2,300 miles of pipe.

The farmers' response to Texas Gas' progressive soil program has been enthusiastic. Houston C. Taub, of Hardinsburg, Kentucky, has this to say about it:

"Texas Gas has certainly done a fine job of restoring my land by terracing and seeding with a year-round cover crop to prevent erosion."

Memo to citizens of Hopkins County:

Attached information from our company newspaper, **PIPELINE PROGRESS**, is printed to give you news about our new pipe line through your area and to inform you of activities of our natural gas transmission system. You may receive regular copies of **PIPELINE PROGRESS** by writing to:

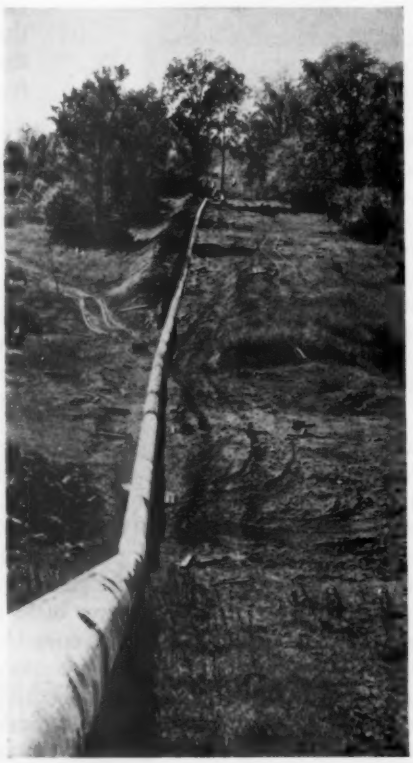
TEXAS GAS TRANSMISSION CORPORATION

P. O. BOX 377, OWENSBORO, KY.

Soil conservation program was announced by newspaper advertisement. An attractive and instructive booklet was also prepared and distributed.

The Texas Gas soil conservation program was launched late last fall. It marked the first time a company in the natural gas industry had organized a conservation department headed by experienced agriculturists who have the material, men and equipment to do a specialized job of aiding the farmer and improving the soil above the pipe lines.

To do a complete job the company has budgeted approximately $225,000 for labor, seed, fertilizer and equipment. Six months ago landowners were informed that the company was prepared to take steps to protect the land through which the new pipe line passes. This development will prove of benefit to Texas Gas as well as the farmer since it is expected to reduce the cost of pipe line maintenance.



General view of terrain during pipe line construction.

Below—This picture was taken after a Texas Gas crew had seeded and terraced the land disturbed by laying the pipe line.

PENSION PLANS:

by James H. McGourty
Labor Relations Analyst

Part 2: Trust Fund Method Is One Solution to Financing Problem

J. H. McGourty

THE monies for the payment of benefits under a pension and retirement plan come from a fund collected as a result of contributions of the employer, or the employees, or both, or are paid out of the current operating revenues of the company. A funded plan will provide for the cost of ultimate benefits actuarially determined and reserves established during employees' working years.

The payment of retirement benefits out of the current operating revenues of the company, known as pensions on a pay-as-you-go-basis, will actually only serve to give the company a pension payroll in addition to its regular productive payroll. It does not produce satisfactory employee relations.

Long Term View

This is so because the employees realize that no money has been allocated for the payment of retirement benefits and the company may not be able to live up to its pension promises in times of economic stress.

Certain labor unions have emphasized this method of financing in an effort to establish the principle of "company pay all" pensions. At first glance, pay-as-you-go may appear to be less expensive than a funded plan since the company is relieved of making annual contributions during the employee's productive period, but the interest factor, which may reduce the cost in a funded plan by half, over the long term, is not present here.

This type of financing does not lend itself to the long term planning that is essential to economic stability within the utility company. Funding at retirement age is essentially the same as pensions on a pay-as-you-go basis and results in the same rising costs dangers which are incurred as the working force ages and reaches retirement age.

In thinking of pensions, management must have in mind the Treasury Department's definition of a retirement plan. The department defines a pension plan as "a plan established and maintained by an employer primarily to provide systematically for the payment of definitely determinable benefits to his employees over a period of years, usually for life, after retirement."

There are two principal methods of funding pension plans. These are the insurance method, with its three usual forms (i.e. regular group annuity contracts, deposit administration contracts and individual contracts) and the trust fund method. This article deals with the latter, the trust fund.

Data Which Are Needed

Factors For Actuarial Computation: In financing the pension plan by means of a trust fund, management should have at hand the company's experience as regards its employee mortality, severance and disability histories. These factors will indicate when and in what amounts funds will be required to make payments due under the plan, on the basis of age, sex, compensation and length of service of each employee.

Calculations are then made on the basis of an assumed rate of investment return to determine the amounts to be set aside periodically, to be invested and accumulated, in order to provide sufficient funds to meet the pensions as they become due. These calculations are checked periodically with actual experience and necessary adjustments are made. Contributions are made to the fund by the employer (and the employees if the plan is a contributory one) on the basis of these computations.

There are many consulting actuaries of high professional standing who are ready and qualified to advise management on these matters and to supervise its pension trust reserves. Independent actuaries, specializing in this field, have for many years been retained as consultants and supervising actuaries, by management in connection with some of the outstanding industrial and utility company plans of the nation.

Trustee Has Four Duties

Selection of Trustee: Under the trust fund method of financing pensions, management institutes a trust by executing a deed of trust or trust instrument. Contributions are made to the fund as required by the retirement plan, as agreed upon with the bargaining representatives of the employees or as determined by the employer. The fund is entirely separated from the company's control or assets. Payment of benefits is dependent upon availability of funds in the trust. Benefits are paid as they become due or as a single premium annuity is purchased.

The actual operations performed by a trustee may be classified in four categories. These are (1) investment administration, (2) investment management, (3) custody of assets and (4) accounting and reports. Naturally there are many sub-responsibilities under these four main categories which require the maintenance of an experienced and efficient organization.

In the selection of a trustee for the funds, management should avail itself of the facilities offered by many of the larger banks and trust companies. These organizations have personnel trained to serve as trustees, to administer the plan, to supervise investments and to guide management in the initial stages of setting up the retirement program.

Some employers have appointed company officers and employees to act as

trustees while other companies have sought to embody the experience of the professional in their trustee and have comprised their trusteeship of company officers and trust company personnel.

Investments: Advocates of the trust method claim that pension liabilities are an investment problem rather than an insurance problem. They claim that investments are primarily the business of a corporate trustee. There is no serious risk or "catastrophe hazard" involved.

Realistically, a widespread disaster would only increase the duration of the life insurance liability and reduce the pension liability. Even an increase in life expectancy, above that anticipated, would be a slow and gradual process. Furthermore, the actual payment of pensions will require only a small part of contributions at first. When the theoretical "levelling off" point is reached, the then current contributions plus the interest from the fund would cover the pension payment. If pension funds are invested at the long term investment rates, the fund will obtain what is known as a "latter schedule" of maturities. This will result in each maturity being reinvested at the then long term investment rate. So long as interest is paid when due and maturities are met, market prices of securities have no effect.

View of Chase National

There is no distinction between principal and income in this type of trust and investments may be made to at least meet the accrual rate. The Chase National Bank of the City of New York points out in its printed material on pension trust funds that if contributions to a pension trust fund are computed at 2½ per cent rate, an investment paying 4½ per cent per year could be sold after 20 years at a loss of 40 per cent of principal without actually incurring a loss in the funding of the plan.

With the trust fund method the investment return can be increased, provided the trust instrument permits it, by investing pension funds in common stocks or real estate. This procedure is not without risk particularly for a small account, which necessarily would lack the ability to diversify its investments on a large scale.

However, since many of our economic thinkers are cautioning that if the spread of pension plans continues to the point where it embraces between 20 and 40 million of our manual workers, a considerably lower rate of interest on long term obligations may result than prevails at present.

With this thought in mind, management should be thinking in terms of future procedures to provide adequate investment return for pension funds and should anticipate this problem when instituting the trust instrument for the pension plan. The Old Colony Trust Company of Boston has prepared an instructive booklet entitled "Should Common Stocks Be Used In A Pension Fund?"

The basic cost of any retirement plan is expressed by the formula: Dollars paid retired employees plus administrative expenses less interest accumulated equals cost of retirement plan. This formula is true regardless of what method of financing is selected for the pension plan. Proponents of the trust fund method of financing pensions are quick to point out that the trust fund can handle investments at a lower cost than the insurance companies. This is true, they claim, because income derived from funds allocated for pensions in a trust fund is tax exempt while insurance companies must pay a tax on the return on their investments.

Company plans provide a second layer of income for a worker's later years.

An approximate comparison can be made as to the relative so-called administrative charges made by the two principal systems of financing pensions by saying that the total of these charges in connection with a trust fund, which will include the trustee's basic fee, the investment fee, a custodial charge, the charge for actuarial services and miscellaneous expenses will be less than one per cent of contributions even for small companies.

The expenses involved in connection with the group annuities type of financing of the insurance companies is called a "load charge". This includes investment expense, taxes, administrative expense depending on the size of the account, ranging from 1½ to three per cent and a voluntary contingency reserve, the whole totalling eight per cent of contributions.

An important factor and further expense is incurred in connection with withdrawals from the service of the employer, and from membership in the pension plan, when group annuities are purchased, referred to as severance expense. This charge amounts to roughly four per cent of contributions. It is, of course, made against employee contributions, if the plan happens to be a contributory one.

The Chemical Bank And Trust Company cites an approximate estimate of the cost of a plan in its retirement plan guidebook. This example is based upon a company having 3275 employees eligible for participation in the pension plan. The benefits for future service credit are figured at one per cent on salary up to $3000.00 per year and 1½ per cent on the excess. Past service is funded at one per cent of salary and amortized over 11½ years. Employee contributions consist of two per cent on the first $3000.00 salary and four per cent on the excess. The cost to the company, after deducting employee contributions, is four per cent of participating payroll for future service cost and 4.3 per cent for past service cost.

It is only fair to note, however, that if the actual expenses involved in a group annuities contract do not run to the eight per cent load charge, some portion of it is usually refunded by the insurance company, either as dividends in a mutual company or as rate credits in a stock company.

Savings Estimate

Those favoring the trust fund claim that the cost differential in outlay will average 15 to 20 per cent in favor of the trust fund method.

With the trust fund method all employees may be included in the plan, regardless of age, service or rate of turnover, without increasing the cost or the outlay if withdrawals from service are anticipated. This is true because employees who leave their jobs and withdraw from membership in the plan, prior to retirement, are simply not entitled to retirement benefits.

There are no surrender charges or fees levied for lapsed policies. Employees may be retained in service beyond normal retirement age without complications or heavy expense. This permits management to include those employees within the plan who are near retirement age and,

Illustrations drawn for The Lamp, house magazine of Standard Oil Company (New Jersey) by Charles Martin.

in many cases, are the employer's primary retirement problem.

The trust fund is well adapted for a variety of eligibility factors for retirement as regards retirement age, retirement to become effective after a specified term of service—for example 30 or 35 years—or a combination of two such provisions. The plan may readily include a provision that an employee may retire upon severance due to disability. Such features as these may produce good employee relations but might not be considered sound underwriting practice, for an insurance company.

A wide variety of pension formulae is possible under the trust fund method. Pension benefits based upon final or final average compensation are readily worked out under this method of financing.

Under a trust fund the plan may permit the retiring employee to elect any one of a number of optional types of benefits that might fit his particular needs so long as it is actuarially equivalent in value with the basic life annuity. This feature will involve some additional cost but such flexibility may prove of great value to both the employer and the employee.

Social Security Tie-Up

The trust fund is well suited to integration with social security benefits. Where the plan promises pension benefits only in the amount that can be purchased by the accumulated funds, the agreement can state that company contributions will be decreased as social security benefits are increased.

The amount and schedule of employer contributions may be fixed and changed without the approval of the trustee. A variety of actuarial procedures is possible with the trust fund. The actuary will compute the amount of the contribution and fix the time for payment to the best advantage of the particular case. The actuary may exercise his right of choice in connection with employer contributions to choose either the step-rate or the level premium method of computing amount of employer contributions.

The step-rate basis is the funding each year of the cost of that year's credited pension. The level premium method is the funding of part or all of the pension cost by equal payments during each employee's working years under the plan. It may be level in dollars or a level percentage of employee's earnings. Both the step-rate and the level premium method have certain advantages. Management, with the advice of its actuary must decide which method most conveniently fits the company's schedule of earnings and financial commitments.

The use of the level premium method enables management, assuming interest rate and number of employees, to estimate more accurately the amount of the

The uniform scale of annuity benefits adds to incentive to work for advancement.

contributions that must be made to the funds in years to come. This method lends itself nicely to the long term planning of the utility company. The level premium method, which may be used under the trust fund method, permits the inclusion of three important actuarial factors:

These are (1) probable future mortality, (2) probable future withdrawals and (3) probable future changes in compensation.

This arrangement enables the contribution to be an expression of a continuing level percentage of payroll.

Under the trust fund a certain amount of flexibility is permitted in the selection of the rate of interest and the mortality table to be used. There is a freedom of choice as to the times when the employer will make his contribution. Under the trust fund an employer may make his normal, current, service contribution at any time during the tax year without consulting another party. Of course, if the contribution is made at the beginning of

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Employees, through contributing with the company, are building large annuities.

Blueprint for Chaos?

By J French Robinson
President, The East Ohio Gas Co.

The Federal Power Commission [in the East Ohio Gas Co. case] has succeeded in using the Natural Gas Act to launch federal seizure of the constructive forces of State and local regulation which as developed in the past half-century have brought more and more natural gas to more and more people at less cost.

The FPC has carried its battle to the Supreme Court of the United States, and it has emerged victorious. Years of chaos in the natural gas industry will follow unless we do something about it—now!

The heart of the FPC's attempt to regulate natural gas distributing companies is contained in the "stub-line theory."

The great interstate natural gas pipe lines avoid thickly populated communities for reasons of safety and economy. Most purely local distributing companies thus must construct and operate high pressure transmission lines to connect their plants with these interstate pipe lines.

These connecting lines are known as "stub-lines." Gas from the interstate lines flows into the stub-lines at high pressure, without any halt in its movement. It is difficult to determine where the movement of such gas does stop, since in many cases the ultimate stopping point may be the burner tip of a customer's kitchen range.

The FPC contends that since the movement of the gas under high pressure continues in the stub-lines, it is still in interstate commerce while going through them. Even though this is technically just a necessary and incidental part of local distribution, a few miles or less of such pipe gives Federal control over all.

It has been decided by the Supreme Court that the language of the Natural Gas Act upholds this theory, and only amendment of the Act can effect a change.

The majority opinion said, contrary to the practicalities of the gas industry and to universal State practice, that "States could regulate interstate gas *only* after it was reduced in pressure and entered a local distribution system" or "local mains."

The majority decision also pointed out that "once a company is properly found to be a 'natural-gas company,' no state can interfere with Federal regulation. That a state commission might also have some regulatory power would not preclude exercise of the Commission's functions."

Doesn't this clearly mean that the

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Inter-Industry Fuel Policy Study Needed As Bar to Increased Regulation

By E. Holley Poe
E. Holley Poe & Associates, New York

THE natural gas industry exists and grows and will continue to grow in exact proportion to the contribution it continues to make to the common good and to the real national welfare. That we cannot ignore when we think about the future of the industry, and it is a responsibility that we all of us have to assume if we hope to keep it healthy.

Political theory is an increasingly important factor in the future of all enterprise in the world today. Political theory changes, and there is no denying that the swing is now to the left. I would be the last person in the world to say that we should supinely submit to all of the radical measures that are being urged on this country today. But if we close our eyes to them, or refuse to adapt ourselves to change as it becomes necessary, we are only playing into the hands of those who would enslave us.

While the progress of our industry has been spectacular in the last ten years, and while its possibilities are great, there are definite and very pressing problems of business statesmanship that must be studied and solved, if we are to avoid the evils of un-economic competition with other fuels on the one hand, and the spectre of tightened Federal restrictions on the other.

You all know the fate of the Kerr bill at the hands of President Truman. Most of you must have been aware of the campaign of misstatements and half truths that was whipped up to induce the presidential veto. What you may not know is that a few of the natural gas transmission companies while not actively working against the bill, were covertly supporting the opposition to it. In this they were in the coal camp, lined up against the majority of opinion of those in their own industry.

Of course the oil industry was almost unamimous in support of this bill, because it would have solved once and for all the troublesome question of how far into the field of oil and gas production the FPC would be allowed to go. But while the oil industry has registered its opposition to any measures of further FPC control over the prices to be paid for natural gas in the field, how has it stood with respect to proposed measure that would apply other restrictions on the natural gas industry?

Last month the Independent Refiners Association appeared before the Texas Railroad Commission and urged that the Commission adopt a formula, under the guise of conservation, whereby gas would be given the same proration treatment in allowed production as crude oil. Presumably the end desired is to prevent excess production of light hydrocarbons, butane and propane, but the net result would be to restrict gas production in Texas to the same percentage increases or decreases that occur in the production of oil. The immediate aim of the association is to have the Texas gas supply reduced 26 per cent under its 1948 rate.

These straws in the wind all point in one direction. They indicate that the different fuel industries, and the several segments of each one are all willing right now to invoke some sort of legislative restriction, either state or federal, if they think that legislation will work to their advantage and will tend to restrict or harass their competition.

I have not gone into the intra-industry feuding that has gone on even within natural gas ranks—but it exists. Competing pipe line companies, and the divergence of interest between natural gas transmission companies and distributing gas utilities have all resulted in the spectacle of an industry fighting within its own ranks for the edification and entertainment of the public.

The end product of all of this kind of maneuvering is bound to be detrimental not only to our gas industry, but to the oil and coal industries as well. It invites, and in my opinion may ultimately bring about, federal control of the entire fuel industry.

A national fuel policy sounds like an attractive and an orderly way to achieve by government study and recommendation a harmonious and economic relationship between all fuels. But is it?

A national fuel policy without legislation to enforce it would be as meaningless as a national policy in favor of kindness to stray animals.

To regulate the fuel resources of the country, and to divide them and restrict them with respect to the markets, or the uses, or the territories that each would serve, could only be accomplished by the most stringent and absolute control of every coal mine, every union, every oil well, every gas field, and every retail distribution outlet for any of their products. Regulation, control and price fixing, under a Fuel Czar appointed by the President is the only effective means that I can see for implementing and making effective such a policy if it is ever once decided upon.

I cannot believe that any of the fuel industries, or even coal labor unions, would welcome such extreme measures to resolve the difficulties that the new competition from natural gas has erected for them.

Since all cooperation has to start from some common meeting ground, that, it seems to me, is the one premise that we can all subscribe to—we don't want and don't need a fuel Czar for this nation. To avoid this very definite and immediate threat, it will be necessary for all of the fuel industries to reappraise their position with respect to the national economy and the greatest public good.

The administration apparently wants to devise some system of price control by which the cost of coal to the consumer will be kept up. By vetoing the Kerr bill, President Truman erroneously assumed (or pretended to assume) that he wanted to keep gas prices down. But

(Continued on page 46)

Part of a paper delivered at the Short Course in Gas Technology at Texas College of Arts and Industries, Kingsville, Texas, May 1950.

Experiments in Underground Gasification Of Coal Continue at Gorgas

By Milton H. Fies and James L. Elder

THE United States Bureau of Mines and the Alabama Power Co. are interested in underground gasification of coal from the standpoints of power generation, synthetic liquid fuels manufacture, and conservation of natural resources. In view of these mutual interests, the two organizations are conducting a series of experiments designed to develop the possibilities of this method of utilizing coal.

The successful application of processes for gasifying coal in place will make available (1) a source of energy for generating electric power, and (2) gaseous products suitable as the raw materials for synthetic liquid fuels manufacture. It offers a method of utilizing coal veins now difficult or uneconomic to mine, and it may be possible by proper application to recover the residual energy remaining underground in regions where pillars and blocks of coal remain unmined in abandoned coal operations.

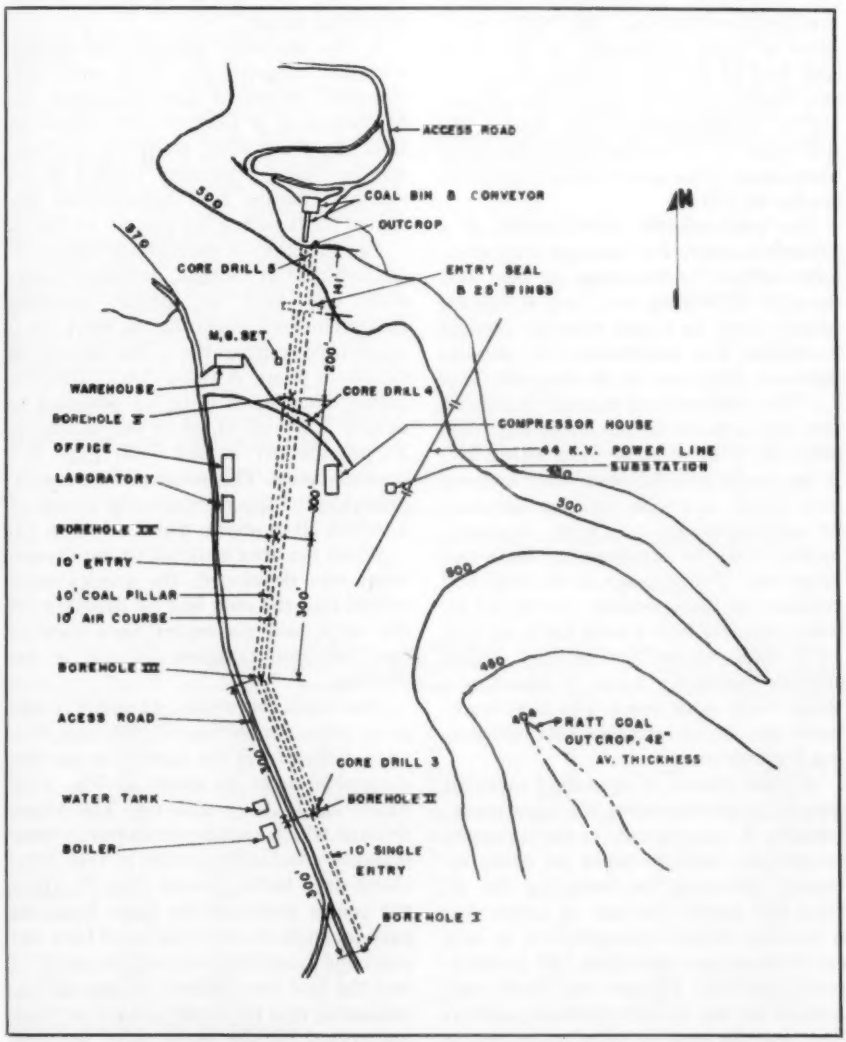

Fig. 1. Plant layout; plan of underground gasification project.

Mr. Fies is consulting coal mining engineer, Synthetic Liquid Fuels Branch, Bureau of Mines, US Department of Interior; manager, coal operations, Alabama Power Co.; consulting mining engineer, the Southern Co., Birmingham. Mr. Elder is supervising engineer, Gorgas Underground Gasification Project, Synthetic Liquid Fuels Branch, Bureau of Mines, US Department of Interior, Gorgas, Ala.

Presented before Interstate Oil Compact Commission, Biloxi, Miss., May 1950.

Synthetic liquid fuels can be made from three major raw materials—coal, oil shale, and natural gas. Of the three, coal is by far the largest potential source. Excluding atomic energy, coal is estimated to comprise more than 95 per cent of our mineral fuel-energy reserves.

Two basic processes have been developed for converting coal into oil: (1) The direct-hydrogenation or Bergius process; and (2) the gas-synthesis or Fischer-Tropsch process. Both require the production of a gas as a preliminary —and costly—step.

In the first process, a large volume of hydrogen is required for catalytic addition to the coal under high pressure to produce liquid fuels directly. Hydrogen now constitutes 50 per cent of the total cost of the liquid products.

In the second process, synthesis gas—a mixture of carbon monoxide and hydrogen obtained by gasifying carbonaceous materials—is required for catalytic conversion into liquid fuels. The production of synthesis gas now comprises 50 to 70 per cent of the total cost of the products.

It is readily apparent that low-cost production of the required hydrogen and synthesis gas is the key to the entire problem of competitive liquid fuels from coal. Pure hydrogen can be obtained from synthesis gas by reacting the carbon monoxide with steam and removing the carbon dioxide formed. Therefore, development of an economical method for

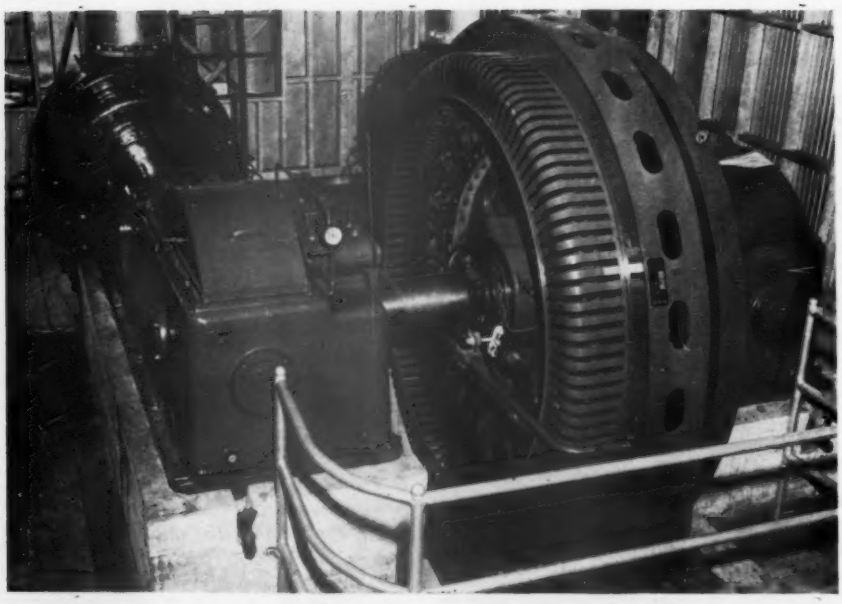

Fig. 2. Two cylinder reciprocating compressor, 7200 cfm, discharge pressure 30 psig.

producing synthesis gas would aid immeasurably in solving the problem.

At this time four major processes are in use for manufacturing gas. These are: Producer-gas process; cycling water-gas process; continuous water-gas processes; and carbonization of coal.

As now applied, all these gas-making processes have entailed the use of mined coal and costly equipment, with the result that the product has been a relatively high cost gas.

The Bureau of Mines and the Alabama Power Co. have jointly conducted and completed one field-scale experiment in the underground gasification of coal and at present are cooperating in a second field-scale experiment. The Bureau of Mines has, in addition, carried out laboratory-scale investigations relating to the same subject. These investigations have been described in a series of papers which are listed on page 18.

The first field scale experiment indicated that, under the test conditions, the combustion of coal in a solid stratum underground could be maintained; the coal could be completely consumed; the high temperatures developed brought about physical changes in the overlying strata that appeared to be favorable to the process; and by changing the operating procedure various types of gas could be produced.

The laboratory investigations that followed the first field scale test indicated that it should be possible to use a simple air blast and produce a gas having a heating value of 100 or more Btu per cu. ft. by underground gasification, provided similar conditions could be established and maintained underground.

The results of the first Gorgas experiment and the laboratory work that followed led to the construction of the present larger-scale underground gasification project at Gorgas, Ala. This experiment is being conducted in the Pratt coal bed in an area isolated from the main body of coal by nature and consisting of approximately 100 acres. The coal seam is 42 inches thick and relatively level; it lies under an average overburden of 150 ft.

The experimental unit consists of a 1,540-ft.-straight-line passage in the coal, with surface connections at one end through an outcrop seal, and at various points along its length through vertical boreholes. The installations for this experiment are shown in the diagram (Fig. 1). The underground passage is divided into five sections, the one extending from borehole V to the entry seal being 200 ft. in length and the other four sections each 300 ft. in length. Each section may be used separately as a unit, or several sections may be combined to form one large unit. The passage in the coal bed consists of two parallel entries 10 ft. wide, separated by a solid pillar of coal 10 ft. thick, except for the inby section between boreholes I and II which is a single 10 ft. wide entry. The large boreholes are drilled into crosscuts connecting the entries.

A wide choice of operating methods may be employed during the experiment. Initially, it was planned to use a simple, continuous, unidirectional air blast, although provision for reversing the air blast was made. The use of steam also is possible, either intermittently, as in a cyclic water-gas operation, or continuously with air. Oxygen has been considered for use in underground gasification, but its cost in large quantities is prohibitive, at present, and for this reason the current experimental work will be done with air or at a later date with air and steam if desirable.

The objectives of this second underground gasification experiment are:

1. To determine the quantity of coal that can be gasified from a given initial combustion zone and the shape and extent of the burned-out areas formed during this gasification.

2. To test the design and installation of types of fixed product-gas outlets, including the seals required.

3. To determine the operational characteristics of the experimental installation under such variation of conditions as the nature of the installation and the progress of the work may indicate to be desirable—for example, the length of passage required, the optimum rate of flow, and the pressure drop.

4. To determine the quality and quantity of the product gas generated and the secondary byproducts evolved under the experimental conditions.

5. To obtain all possible information regarding the action of heat on the overlying strata.

6. To develop, without interfering with the foregoing objectives, such fundamental technical and economic information as is likely to be helpful in selecting plant sites, plant installations, and operating processes. Testing of refractory linings and installations designed for handling hot gases is included.

Construction of the underground gasification unit at Gorgas, designed to operate one year or longer, required equipment and construction work on a magnitude comparable to that of a small industrial plant. A two-cylinder reciprocating compressor (Fig. 2) designed to deliver 7,200 cu. ft. of air per minute at 30 pounds per square inch gage has been installed. This source of air is connected to the five boreholes by means of a valved 20-in.-diam. manifold (Fig. 3).

When the area assigned to the experiment was developed, the entries were driven into the coal bed by shooting off the solid, and conveyors were used to load out and transport the coal to the surface.

Two 18-in. boreholes, (I and V,) and three 28-in. boreholes, (II, III, and IV,) were drilled from the surface to the underground entry as shown in Fig. 1 by means of a churn-drill rig. The strata through which each borehole passes were pressure-grouted by means of four 6-in. churn-drill holes spaced four ft. from the center point of the large hole. At each location the first two holes took appreciable quantities of cement grout—and the last two refused to take grout, indicating that the underground crevices intersected by the holes were securely stopped.

The five large boreholes were sealed at the surface by lengths of 20-in. water-jacketed steel pipe set in concrete. These seals extend approximately 25 ft. below the surface and were seated in hard rock.

The two 18-in.-diameter boreholes were unlined below the seal. It is possible that the natural strata will crumble and slag at high temperature, blocking the borehole; however, it seemed advisable to test this type of construction. A refractory lining has been installed in the three 20-in. holes. A 20-in.-diameter pipe casing was set in each hole, and a refractory concrete mix was poured into the four-in. annulus.

In addition to the large boreholes, a number of test holes were drilled at various points off the line of the single entry in order to measure the temperature rise in the coal bed. These were placed in a pattern so arranged that the progress of the combustion zone could be traced as combustion of the coal faces progressed between boreholes I and II.

The entry seal, located 141 ft. in from the outcrop, consists of a wall extending across and 25 feet beyond the ribs of the entries. This wall extends six ft. into the roof rock and two ft. into the bottom. It was constructed of three courses of fire brick, backed and sealed with concrete and cement grout. Outlet pipes, 24 in. in diameter and fitted with blow-out disks, have been set in the wall. The design and testing of an entry seal are requisites in underground-gasification experiments.

Combustion was started near the bottom of borehole I in the entry at the end farthermost from the outcrop. Air was supplied at borehole I and products of combustion were taken off 300 ft. away at borehole II. A low rate of air blast was used initially and gradually increased as combustion was established. For a few days after ignition the gases evolved showed decreasing percentages of oxygen and increasing percentages of carbon dioxide. After 10 days operation, the oxygen content of the effluent gases had increased, and the high temperature zone underground had moved downstream and was near the base of borehole II. The direction of flow was then reversed in an effort to spread the combustion over the entire 300-ft. passage, and since this first 10-day period of unidirectional blast operation, periodic reversals of flow have been made to store the maximum amount of heat underground and to stabilize the combustion zone.

Excess oxygen continued to appear in the effluent gases, and it became apparent that a portion of the air blast was contacting hot carbonaceous materials and that large percentages were bypassing the coal faces and flowing through broken rock near and over the center of the original entry. It was decided to inject a fluidized solid medium into the void spaces over the line of the original entry in an effort to force contact between all of the air and the coal faces. Holes were drilled along the line of the entry and sand was fluidized with air and injected into this area. Table 1 shows the effect of admission of the fluidized sand on the back pressure or resistance to flow through the system.

Table 1—Back-pressure development

	Av. back pressure at 7200 cfm air flow, pounds per square inch gage
May 1949	4.1
June 1949	5.0[1]
July 1949	6.9
August 1949	8.2
September 1949	9.4
October 1949	13.1

[1] Admission of fluidized sand began June 22, 1949.

Fig. 3. Twenty inch air manifold.

Table 2 summarizes operation of the project since its ignition in March 1949. During the period from March through September, it will be noted that the rate of combustion of coal was practically doubled. This increase in combustion rate was due in part to use of the fluidized sand and indicates that some degree of success was attained in blocking off underground crevices and void spaces by using this technique. A total of 156 tons of sand was fluidized and injected underground between boreholes I and II.

In October, November and the early part of December, the length of time between reversals of flow was increased, and it was found that a combustible gas was being generated on the coal faces and subsequently burned by bypassing oxygen underground. During this period the 20-in. outlet stacks were operated at 1,600° to 2,400° F., with gas burning in and above the stack. Coal consumption near the base of the outlet stack increased, and the gaseous products were evolved at temperatures high enough to make possible their use in raising steam or in operating a gas turbine. The heat balances run on the operation show that more than 50 per cent of the heat of combustion of the coal is brought above ground in the effluent gases.

Table 2—Coal consumption and heat balances

				Heat balance, per cent of heat of combustion of coal consumed			
Month	Coal consumed, tons[1]	Cumulative coal consumed, tons[1]	Coal consumed, tons[1] per day[2]	Sensible heat content of dry effluent gas	Heat of combustion of-dry effluent gas	Sensible and latent heat content of moisture accompanying dry effluent gas	Heat left underground, by difference
1949							
March	120	120	8.9	21.3	9.3	—	59.4[3]
April	201	321	6.7	31.9	11.6	—	46.5[3]
May	312	633	10.1	36.0	23.5	—	30.5[3]
June	337	970	11.2	29.7	34.2	—	26.1[3]
July	452	1422	14.6	24.4	24.3	—	41.3[3]
August	441	1863	14.2	22.9	26.2	11.2	39.7
September	485	2348	16.2	19.1	32.0	11.7	37.2
October	583	2931	18.8	21.4	34.1	13.7	30.8
November	454	3385	15.9	17.9	31.9	11.5	38.7
December	535	3920	19.7	18.4	24.2	8.9	48.5
1950							
January	486	4406	15.7	7.7	22.9	12.8	56.6
February	393	4799	14.0	9.8	18.9	14.0	57.3
March	326	5125	10.5	10.0	14.2	16.4	59.4

[1] Basis of moisture- and ash-free coal.
[2] Total tons divided by operating days.
[3] Assuming 10 per cent for heat content of moisture.

Samples of gas were taken from test holes estimated to be very close to the burning coal faces, and typical analyses are shown in table 3:

Table 3—Analysis of gas flowing near burning coal ribs

Sample Point	Test hole 6[1]	Test hole 13[2]
Gas Analysis		
CO_2 ..... per cent	10.4	8.5
III	.3	.2
O_2	.7	.0
H_2	10.9	11.4
CO	10.0	15.5
CH_4	2.3	2.0
N_2	65.4	62.4
Heating value Btu per cu. ft.	97	111

[1] Sample point, 75 feet north and 35 feet east of outlet stack; direction of blast, north to south (II to I).

[2] Sample point, 30 feet west of outlet stack, direction of blast, south to north (I to II).

Effluent gases having the following composition were obtained just before ignition of the gas by bypassing air underground. The excess oxygen still present burned the gas made on the coal ribs, and the high temperatures obtained during this period were due to this combustion.

	Average per cent
CO_2	8.8
III	.3
O_2	10.0
H_2	2.6
CO	2.0
CH_4	.8
N_2	75.5
Heating value, B.t.u. per cu. ft.	29

One of the objectives of this underground-gasification experimentation has been to determine the quantity of coal that could be burned from a given initial combustion zone. In table 2 it is shown that 5,125 tons of coal were burned between boreholes I and II from March 1949 through March 1950. These data and information obtained from the test holes indicate that the coal faces have receded by 40 ft. midway between boreholes I and II and by 65 ft. near the boreholes themselves. This means that a total area, approximately 130 ft. wide at the boreholes, 80 ft. wide at the midpoint of the passage, and more than 400 ft. long has been burned out, and to date no limit as to the quantity of coal that can be utilized from a given initial passage has been reached. Further, no difficulty has been encountered in maintaining combustion of the coal underground.

From the operation of the project, the optimum length of path underground has not yet been determined. Experimentation at this time is being carried on to determine the effect of a shorter-length path or combustion zone by means of the construction of boreholes off the line of the original entry at appropriate locations. One such trial hole has already been installed and tested; and, using a combustion zone having a length of 150 ft., it was possible to produce a gas having a heating value of 90 Btu per cu. ft. for an eight-hour period. Other experimental work now being carried out is being directed toward concentrating the combustion zone in a specific location and also to control bypassing of the blast medium, air, by plugging of underground crevices and openings through the use of fluidized finely divided solid mediums.

The entire operation of the experimental installation has been conducted between boreholes I and II. From time to time additional six-in. churn-drill holes have been put down either along the line of the original entry or in regions where the coal had been burned out. These holes have indicated that the overlying strata have been subjected to temperatures high enough to discolor and modify their physical characteristics for a distance of at least 15 ft. Where they were drilled along the line of the original entry, void spaces have been found at the level of the coal bed; and, where drilling has been done in areas where the coal has been consumed, the roof rock appears to be down, and no void spaces have been found. Thus the roof action has been favorable to the process away from the line of the original entry, and along the line of the original 10-ft. entry a condition more favorable to bypassing the coal faces has been set up. Further experimentation is being conducted, using fluidized solid mediums to minimize this effect.

When the investigation of underground gasification processes was begun, it was felt that the development and construction of the required types of installations would cause serious difficulties. Today, the experimental installations at Gorgas have proved quite adequate to maintain and exercise a measure of control over the combustion of coal as it is naturally situated underground.

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Midwest Industrial Council Has Two Day Meeting

Nearly 150 industrial gas men attended the two-day meeting of the Midwest Industrial Gas Council at the Hotel Gary, Gary, Ind., May 25 and 26.

It was held under the sponsorship of the Northern Indiana Public Service Co., and Clarence W. Goris, division supt. of the company, gave the address of welcome.

H. Pelphery, research engineer, Michigan Tool Co., Detroit, gave a technical talk on the "Hot and Cold Treatment of High Speed Steel" as carried out by his company.

Stewart C. Parker, industrial sales engineer, The Peoples Gas Light and Coke Co., Chicago, followed with a paper on "Induction Melting vs. Gas Melting for Non-Ferrous Metals."

G. E. Marble, industrial sales dept., Michigan Consolidated Gas Co., Detroit, presented a talk on "Steam Boilers as a Potential Market for Gas Load."

On the second day the visiting gas men made conducted tours through the plants of the National Tube Co., Carnegie Illinois Steel Mill, and the Sheet and Tin Plate Division of the latter company.

AGA Announces Fourth Annual House Heating Award

The American Gas Association has announced its fourth annual gas house heating award of one thousand dollars, in five awards ranging from fifty dollars to five hundred dollars in cash, for activities deemed to have made the greatest contribution to the advance of gas house heating in the period from September 1, 1949 to September 1, 1950. These awards are sponsored by The Coroaire Heating Corp., Cleveland.

Entries must be received at AGA Headquarters, 420 Lexington Ave., New York 17, not later than September 1.

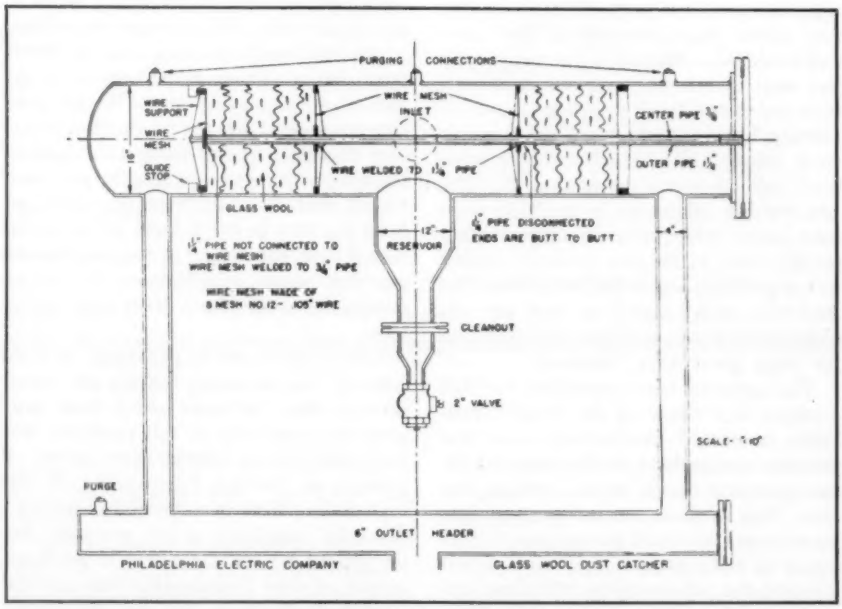
Gas Distribution Systems Face Overload In Changeover Period

By Charles L. Fritz
Philadelphia Electric Co.

THE gas industry as a whole had little or no trouble meeting the normal increased gas demand until the boom created by the War became evident and changed the picture considerably. Industry was thriving and prospering as it had never prospered before, and the gas industry certainly welcomed it. For the 15 years previous, the industry had been more and more feeling the pinch of competition from the electric industry, especially from the cooking and water heating loads which before had belonged almost solely to gas. But, then came the sudden and almost tremendous desire on the part of the public for gas house heating. From 1940 to the end of 1949, our house heating load increased 700 per cent. From 1945 to the end of 1949, our heating load increased over 300 per cent, and the end of the upward trend is not in sight today.

This new load and the revenue created by this load have been greatly appreciated but, like almost everything else, it has a darker side and has brought with it many new problems. The men associated with production have undoubtedly had their troubles meeting the demand of peak loads and solving the complexities of gas interchangeability, but those in transmission and distribution also have found a few problems. Our transmission systems have been able to keep up with this much greater send-out, but in doing so have been very badly overloaded; consequently there have been many more leaks than we would normally expect and which we definitely attribute to the higher pressures the mains are having to carry to maintain the load.

The distribution systems have also had their troubles and a great deal of them are due to the increase in gas velocity which has stirred up dust that before was lying dormant in the bottoms of the mains. This dust is composed principally of rust in particles fine enough that it is easily picked up by the fast moving gas and taken into the services and appliances where it has caused hundreds of pilot outages, blowing seals on the high and medium pressure lines, and piling dirt under the seats of our district and industrial regulators.



Drawing of the glass wool dust catcher.

Dust stoppages and pilot outages have always been present in our system but in the past were not nearly so evident or troublesome as they are today. When our company was producing and sending out carburetted water gas, the gas was much more saturated with light oils and moisture which tended to settle the dust in the mains rather than carry it into the services and appliances. Since the fall of 1948, we have been using a considerable amount of natural gas in the manufacture of our gas which has resulted in a drier gas that does not settle the dust nearly so readily.

In an effort to relieve this condition we have been introducing an agent into the mains which has been a great help to us in dust control but has by no means cleared up the situation entirely. We have been using Carboseal but other companies have been using gas oil, or one of several other oils, and obtaining similar results. The agent, no matter what it is, should have the physical property that when introduced into the mains it will spread itself out over the inside surface of the pipe, thus presenting a greater surface area by which it can actually come in contact with the dust and settle it as it is being carried along by the gas. We have found that when introducing the agent at the high ground level point in the main, regardless of whether the oil flow would be in the same direction or opposed to the normal movement direction of the gas, and letting it drain down to a drip, we have in many cases actually washed a section of the main clean of dust.

The Carboseal was introduced daily, usually in two and one-half, five, and ten gallon quantities added to a similar amount of kerosene which helped to slow the vaporization rate of the Carboseal and exposed it for a longer period to the gas so that it would better accomplish its purpose of coming in contact with the dust and holding it in place. After treating the main in this manner for a period of time of perhaps a week, depending upon the length, the grade, the amount of dirt in the main and the direction and velocity of the gas, we began to get signs

Presented at annual meeting of Pennsylvania Gas Association, Galen Hall, May 1950.

of oil at the drip. In most cases, the first few pumpings of the drip produced an oil that was so thickly mixed with dirt that it was of the consistency of mud. Daily pumpings improved this condition until a point was reached when the solution removed from the drip was as clean as that which was introduced at the high point.

What Way Dust?

This operation has not been a "hit or miss" proposition in picking the spots to oil. During our critical days of pilot outages, a record was kept of these troubles and where they occurred so that each call could be plotted on a gas main facilities map. From this map we could not only see where these stoppages were occurring but could also see what mains were supplying the feeds into the troubled area. It is our contention that the rust trouble originates in the high pressure mains where the velocity is much greater than in the low pressure mains, so our problem was to find what route the dust was taking and from that was decided what particular spots we could do the most good with Carboseal.

The agent has been applied on the high pressure side ahead of the district regulators in most all cases except some low pressure areas where we have treated the low pressure trunk mains feeding this area. This method can serve a two-fold purpose as Carboseal was originally produced to seal cast iron pipe joints by expanding the jute packing. We have carried out this work on mains as small as 4-inch but it is felt not to be advisable to try it on anything smaller.

One very good example of this procedure is a new housing development of approximately 1300 homes of which almost 1000 are heated with gas. The low pressure mains had not been in the ground for two years, yet the tremendous pull exerted by the house heaters first going on simultaneously, sometime about the first week of October, pulled in enough dust to make it the hardest hit from a pilot outage standpoint of all the sections on our system. We knew positively that our trouble came from the 8-inch transmission main feeding the district regulators, so we proceeded to treat the main in several different places where we thought we could do the most good. The results showed up quickly in a decided decrease in the number of complaint calls in that one section, and in less than a week we had practically eliminated the trouble.

As has been stated, the Carboseal was introduced daily into the mains during the critical days of pilot outages. After it had started to take effect, and began to show up in a reduced number of calls, the treatments were cut down to twice a week and finally to once a week when we felt that most of the dust was quited down. We are maintaining the schedule of once a week and will continue to do so until the early part of next fall when we will again concentrate on our trouble centers of last year which we expect will be the centers again this year if not properly treated.

It is our opinion that by setting up a yearly schedule for carbosealing, taking into consideration the time of the year and the expected load along with the information that we have kept on our records, that the trouble coming from pilot outages will be eliminated or cut down to an extent that it will no longer be serious.

Another method being used to eliminate dust conditions is the fogging of gas with an oil vapor just before the gas goes into the mains from the production plant. Our company is not using this method but several other companies are and have found that this saturated gas tends to hold the dust to the bottom of the main rather than stir it up. Oil fogging should warrant some investigation by those companies confronted with dust problems.

Oiling the mains is one form of dust control and treatment but we are using several other methods which have also given us some help on this problem. We have installed an Aerotec dust catcher, a product of Thermix Engineering, on the high side or inlet of a "pound to inches" regulator supplying a low pressure development where there was a previous record of dust complaints. This catcher is of the baffle type and operates on the theory that as the dust-laden gas enters the chamber it strikes the spiral shaped baffles causing the gas to twist and turn. But, the dust particles are heavier and possess more momentum which keeps them from following the pattern, so they drop to a pot in the bottom and the clean gas continues its path on through and into the regulator. This dust catcher is cleaned once a year and at least four gallons of dust and corruption are removed each time that would have gone on and possibly reached pilot tubings and other parts of the appliances. The capacity of the Aerotec is 25 to 45 Mcf with a 4-inch drop.

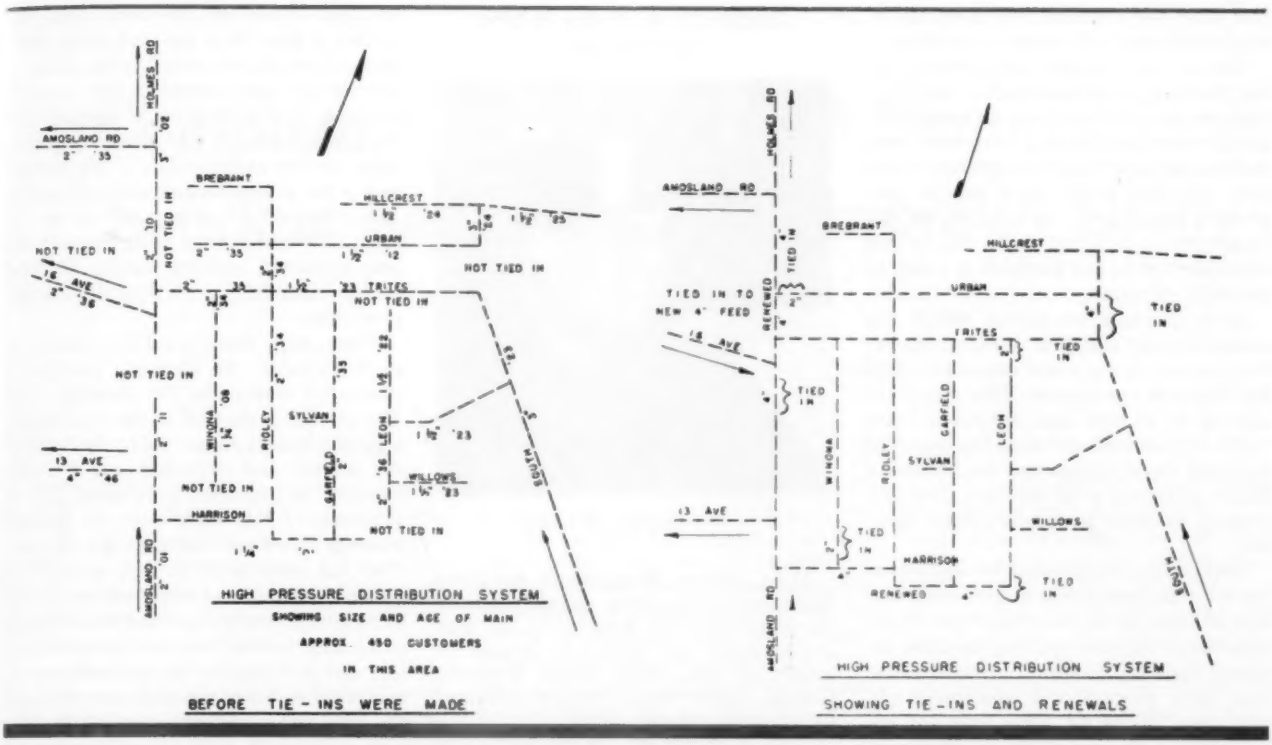
On the inlet side of our largest industrial regulator installation, we have installed a dust catcher that was built by our own men although the basic idea was not our own. A sketch of this catcher is included. The 6-inch inlet comes into the back of the 16-inch main header horizontally and at a dead center position, and then the gas goes either to the left or right passing through a glass wool filter. On the extreme right side is a bolted flange through which the filtering material can be taken out and periodically changed. The glass wool is held in position by a mesh wire both in the front and back, the wire being number 12 gauge, a good stiff wire to prevent buckling and a large opening in the mesh to permit easy passage of gas. Some of the larger particles of dirt when first striking the filter will be repelled immediately and will drop to the reservoir, while the other finer particles will be stopped by the wool. The minimum capacity of this catcher is 50 mcf per hour at five pounds inlet pressure. Although it appears to offer a great deal of resistance to the flow of gas, there is actually only a very small pressure loss through the catcher.

Previous to this installation, we had been having a great deal of trouble with dirt getting under the seats of the regulator and the regulator not holding, also very dirty meters and a lot of dirt going to the equipment, but since we have been using this installation very little dirt has been getting through to the regulator. We consider his set-up as satisfactory as any form of dust control that we are using ahead of regulators.

Blaw-Knox Conditioner

Another piece of equipment with which we have obtained good results is the Blaw-Knox gas conditioner, and this installation at present is also in use on the high side of a large industrial consumer. This is a gas washing or scrubber type through which the incoming gas is forced down into an oil bath where the dust particles and rust come in contact with the liquid. As the gas bubbles up to the top of the bath, the particles have become coated with the oil, and because of the added weight much of the dust and dirt sinks to the bottom of the tank. Those particles that did not drop out rise into a filter of finely crimped and curled wire called the mist extractor which takes in the excess oil and drains it back down to the reservoir. The main supplying the feed for this meter installation is known to be very dirty, so the gas conditioned was put in with the new installation. Within a mile of this site are six other regulator installations that feed from the same main and require cleaning and new seats within relatively short periods of time. The only maintenance required on the Blaw-Knox is an oil change every so often, the time depending on how much gas and dirt has passed through it. During very heavy load periods, the oil had to be changed almost once a month but under normal conditions is good for about a year.

The portion of the low pressure distribution system where the pilot outages due to dust occurred most frequently was, in a large part, in sections at some distance from the plants and were supplied with low pressure gas through district regulators. The sections of the territory which were originally supplied,



Before—and after.

and to a large extent are still supplied, directly from the low pressure holders in the production plants were not without trouble. In fact, in the long run, these sections are our greatest headaches.

The main system consists of cast iron and wrought iron pipe which has been in the ground for considerably more than fifty years. It has continued its usefulness throughout the growing pains of a new and expanding industry. But, in doing so it has been on the receiving end for all of the dust, dirt, water, and chemicals which passed through the plant during the days when the methods of productions were being developed and perfected.

These deposits combined with the internal corrosion which is constantly loosening and dropping from the inside of the wrought iron mains result in not only pilot outages but service stoppages due to both water and dirt, poor pressure due to dirty fuel lines, and poor pressure conditions localized in small sections due to main stoppages.

Poor pressure, due to fuel line troubles, accounts for our most frequent complaint. The remedy, we believe, is similar in most companies and consists of opening the fuel line at the meter and near the appliance, and then applying high pressure air from a bell pump to clear out the obstruction. In some cases it is necessary to use a wire to loosen the scale or to pound on the pipe with a hammer. In the more obstinate cases it is necessary to cut the fuel line once or twice in order to work on shorter sections.

In the vicinity of the production plants, some of the fuel line trouble is due to moisture collecting in a low spot in the pipe. This is blown out with a bell pump as in the case of dust, but, in this instance, some steps should be taken either by the company or by the customer to prevent a repeat call. A drip should be cut into the line at the low spot or the layout of the fuel line must be changed to eliminate the trap.

Just who should perform the actual work and bear the cost of clearing the fuel line and making any changes necessary is entirely a matter of company policy. We have not been able to set up any procedure or work schedule whereby we can definitely cut down the number of these complaints. It appears from our study that the remedy lies in reconditioning the main and service pipes and so cut off the supply of dust and dirt at its source.

Service stoppages also are divided into two categories: those due to water and those caused by dirt and dust. The first of these is, in the majority of cases, easily cleared with a bell pump. Those stopped up with dust and dirt are also cleared with a bell pump but in many cases it is necessary to use a wire to loosen the obstruction so that it can be blown out. A certain percentage of the jobs necessitate the opening of the street in order to satisfactorily complete the work. This is an expensive job and requires time and equipment.

In the case of low pressure service stoppages, we started in 1938 to keep a record of their location and type, that is, water or dirt, and from this record set up a procedure to follow whereby repeaters could be entirely eliminated. The second or third appearance of a complaint at the same address, within one or two years, calls for action.

If the stoppage is on a service smaller than our standard size, it is immediately renewed from the main to the cellar. In case water is causing the obstruction, the service is checked for grade by opening at the curb and the flow of water, introduced in the cellar, is observed. This locates the trapped section of the pipe and that section is renewed immediately. A large majority of our trapped services have been caused by settlement over old sewers.

Should the obstruction consist of dust or dirt, and this particular service becomes a repeater, the street is opened over the main; the service connection is removed from the main and the service thoroughly cleaned with air at ninety to one hundred pound pressure introduced from the cellar.

We have found that the records properly kept, and schedule properly followed, in connection with service stoppages has been a wonderful guide in picking out the bad spots and directing

our time and expenditures in the direction where they will do the most good.

One of our associate companies is using vacuum equipment to clear low pressure services. They are very enthusiastic about the results and consider that method far superior to any method which they had previously tried out or employed. Investigation into the use of this equipment is certainly warranted, as any improvement in our methods is a step in the right direction.

Low pressure conditions which are caused by dirt and dust in the mains affect more customers and create the most troublesome complaints. This condition cannot be located and remedied overnight. Pressure gauges must be employed to locate the stoppage and once found a decision formed as to the most desirable steps to be taken to restore proper service.

Several conditions must be considered before a decision is reached. Perhaps the first of these is, will the main when fully restored to full size opening have the required capacity to fit into the load situation both present and anticipated. If not, then this is the ideal time for renewal with a larger size main. If the main will have the required capacity then the material in the pipe becomes the deciding factor. It is our opinion that cast iron pipe should be cleared. The actual operation of clearing the main consists of taking a shutdown, making the necessary openings, blowing the dirt and dust from the main by use of high pressure air, and then restoring service.

Should the main consist of wrought iron pipe, we believe it advisable to renew the main immediately and not go to the expense of clearing the main. Our opinion is based upon past experience. To begin with, the pipe is more than 50 years old and the remaining life does not warrant expending time and money to clear it and still have the possibility of renewal not too far away. On two occasions in the past, we performed a very good job of clearing sections of a 7-inch wrought iron main. In each case, leaks developed with such frequency that within two years it was necessary to renew both sections with new main.

It is our understanding that the Holland Furnace Co. has equipment and is prepared to clear dust and dirt from mains. We propose to give this company an opportunity to demonstrate their work on some of our dust-filled mains in the near future.

A continuous study is being made of the new load as it is being added to our distribution system and the necessary reinforcements to cover the overall system follow through as routine.

The high and medium pressure distribution systems made up of small steel mains, particularly those two inches and under in diameter, present an entirely different problem. This is particularly true in sections where they have been in the ground 40, 50, or more years.

These small mains originally constituted a very satisfactory medium or high pressure distribution system, but, with the passing of years, they gradually accumulated a quantity of fine dirt and dust. This dust travelled along with the flow of the gas in quantities varying with the velocity of the gas and settled to the bottom of the main when and where the velocity of the gas decreased.

This dust created a certain number of blowing seals, service stoppages, and occasionally a main stoppage. On each of these occasions, one or more customers was inconvenienced or suffered a complete interruption of gas service. The total number of these interruptions per year, previous to 1940, was not considered serious. Service restoration was a routine matter and no definite record was kept of the incident other than the usual file of completed orders.

The tremendous increase in gas output was immediately reflected in the greatly increased number of blowing seals, stoppages in services, and low pressure conditions due to main stoppages.

The restoration of service in the case of the blowing seal involves the cleaning of the regulator and the replacement of the disc. When this has been done, the service is shut off at the curb cock and a garden hose is connected to the head of the service and extended out a cellar window. The curb cock is opened and the gas pressure in the main utilized to blow out the existing dust in the service and in the main immediately adjacent to where the service is tapped on to the main. The curb cock is again shut off, the hose removed, and the service restored to the customer, according to normal procedure.

When the trouble involves a stoppage in the service, the cleaning process is somewhat similar to the blowing seal. The service is shut off at the curb cock, a garden hose is connected to the head of the service and extended out a cellar window, as explained previously, but in this case a flat steel wire is pushed through the hose and into the service. The flat steel wire is then turned or twisted, to create an auger effect, as it is being forced into the service. This loosens or breaks through the accumulated dust and dirt and permits the gas pressure in the main to blow the dust out through the hose and so clear the service. Service is then restored, as in the previous case. This method of clearing high and medium pressure services works in approximately 90 per cent of the cases. To clear the remaining 10 per cent, it is necessary to open the street, cut the pipe, remove the obstruction, and finally replace the part cut out.

Poor pressure conditions, or complete stoppages due to the main itself being choked off with dirt and dust, although much less frequent than the other two forms of interruption, involves more customers, requires longer to clear, and is much more expensive.

The first problem is to locate the stoppage. This is easy if it is a complete shutoff as a house-to-house canvass will tell you where the last customer is located who did not experience low pressure. The stoppage, therefore, is between that customer and the first one that had trouble. On other occasions, the poor pressure condition may have been of very short duration, during a peak hour period, and the exact location of the stoppage cannot be so readily located. In these cases, it is necessary to resort to pressure gauges to get a definite location of the trouble.

The stoppage being located, the next step is to arrange for a complete shutdown either by operating valves or by the use of Mueller control fittings. This requires a house-to-house notification of the customers involved, followed by the shutting off of each meter. The actual work necessary to clear the main consists of making openings 150 to 300 feet apart, cutting a piece out of the main in each

(Continued on page 44)

Doctor D. A. Hulcy Is One Of Sixteen

. . . Doctor of Laws

D. A. Hulcy, President of the Lone Star Gas Co., and first vice-president of the American Gas Association, on May 29 received the honorary degree of doctor of laws from Texas Wesleyan College, Forth Worth. He also delivered the commencement address.

Only 16 honorary degrees have been conferred by this college in its 60 year history.

Complete Replacement of Natural Gas Sendout Reported by Canadian Utility

By Frank D. Howell
Dominion Natural Gas Co., Ltd., Ontario

THERE has been a diversity of opinion on this subject for many years, and in order to eliminate at the outset any wrong impressions, I would like to point out that 100 per cent substitution does not necessarily mean 100 per cent interchangeability.

The Dominion Natural Gas Co., Ltd., serves a large area in Southern Ontario, through an extensive pipe line system, gathering gas from several widely scattered gas fields and delivering it to approximately 50,000 customers in many hamlets, villages, towns and cities. As the name implies, we were a natural gas company engaged solely in the production, transmission and distribution of natural gas until 1940. With the increased demands for gas, and declining production from known fields and some particularly cold weather, a serious shortage developed in the late winter of 1940.

As supply prospects for coming years did not look any brighter, in the spring of 1941 the company found it necessary to seek a source of gas for peak periods. The gas distributed in this area has a specific gravity of approximately .635 with a heating value of 1040 Btu per cu. ft. and the following general analysis:

Methane	86.7	
Ethane	10.4	
Oxygen	0.9	Btu 1040
Carbon Dioxide	0.1	sg 0.635
Nitrogen	1.9	
	100.0	

Several possibilities were investigated at that time and after some little study it appeared from available data, that propane was the best solution of our problem. We were given assurance that sufficient supplies of propane could be made available for our needs. As we were a strictly natural gas company, we had no plants of any kind in which we could manufacture a carrier gas.

Materials were almost non-existent at that time for plant construction, so our alternative was to use air for mixing purposes. As this was an entirely new venture for us and there seemed to be a rather wide divergence of opinion regarding Btu values and specific gravity for passable appliance operation, we conducted an extensive study under simulated field conditions to try and find out what would give us reasonably satisfactory operation. We collected and set up in our Brantford shop a representative cross section of appliances on our lines, of all ages and types. We set up metering, mixing, and regulating equipment and ran wholesale tests of various mixtures, specific gravities and pressures.

We had been informed that we would have to use a Btu of approximately 1400 in order not to have to make wholesale appliance adjustments. Generally speaking, the practice had been on our system to adjust our appliances a little on the soft side. Repeated tests in our shop indicated that we could get reasonably satisfactory performance with a minimum Btu of 1120 and a specific gravity of 1.23. As the input through the orifice varies inversely as the square root of specific gravity, this gave us a considerably lower input volume than with our natural gas. This, however, was somewhat compensated by the fact that the Btu of our propane-air mix was higher. We deemed that this would not be too objectionable a feature in view of the fact that at that time we had considerable quantities of natural gas with which our propane-air mixture could be mixed.

Actual construction of our propane-air plant started in July of 1941, and on November 8, 1941, we put our first propane-air mix into the line. As the percentage of the propane-air in the total send-out was comparatively small, we experienced no serious difficulties although we did find that on appliances that were adjusted with a hard flame there was some tendency for flashbacks.

We found some appliances on our lines which had no means of adjusting the primary air. This was particularly true with the old style Humphrey radiantfire and on these we found it necessary to arrange a primary air-shutter. We had some little difficulty with water heaters which were equipped with the old graduating type thermostat. There was a tendency on these for flashback and carboning up of the venturi throat and burner ports. About the only way to satisfactorily correct this situation was the installation of snap action thermostats. We also found that where the burner drilling was large, there was some tendency to flash back and on a few appliances on our lines there were fixed orifices, and where the input on these was low it was necessary to install adjustable orifices. We find that a No. 40 drill gives us a size port that works best with our gas.

In some of the older ranges with star burners, where these burners were set quite low, the shorter flame gave much slower performance and on these we found it necessary to increase the demand on the burner.

100 Per Cent Change

As the winter progressed we were faced with decreasing supplies of natural gas and our fields are so distributed that it is not possible to gather all the available natural at any one location for mixing purposes so we were inevitably faced, during a cold spell, with 100 per cent substitution of propane-air. This was done as a prime necessity and while we approached it with a feeling of fear and trembling, we found to our surprise and relief that we were able to render quite satisfactory service over a period of about a week's time with no natural for mixing purposes whatever. We did increase our Btu above the minimum to between 1160 and 1180 in order to compensate for the variation in control equipment and the variation of the properties of the propane we were using, as we were using propane from natural gas, refinery propane, as well as varying mixtures of propane and butane. Experience indicated to us that our minimum Btu without too

(Continued on page 37)

Presented at meeting of Operating Section, American Gas Association, New York, May 1950.

GAS DISPATCHING

TELEMETER AND REM

(*Courtesy United Ga*

New Orleans district chief dispatcher demonstrates use of a pin chart in handling the complex network of pipe lines in his district.

WHEN I need a raise or cut in pressure now, I do it myself without leaving the office—just push a little button."

That was a New Orleans city gate dispatcher talking about the new telemeter and remote control equipment in service in his district of United Gas Pipe Line Corp. Incidentally, he has been at this exacting job of controlling pressures and flows for some 20 odd years and is well qualified to compare modern dispatching methods with methods employed when service loads were smaller, flow patterns were simpler and interlinking network of pipe lines was far less complex.

Push button control of flow and pressure regulation at many critical points remotely located with reference to dispatching stations has come as a result of the growing need for maximum efficiency of gathering, transmission and distribution lines. Increasing demands for natural gas service, bigger and longer pipe lines, higher operating pressures, closer integration of transmission facilities—all these have combined to make necessary a minute-by-minute knowledge of what's going on in the system and an on-the-minute control of any combination of conditions that might arise.

Not too many years ago United Gas dispatchers had only the telephone to link them with points of input, with compressor stations along the line and with the centers of delivery and distribution. In the early days, telephone communication was sufficient, and in many operating areas the telephone is still sufficient.

However, at numerous other locations, the demand for natural gas has grown to such extent that any equipment that speeds service and operating efficiency is equipment well worth having around. As the demand for natural gas service has grown, important delivery points have become more numerous, and the discovery of new gas fields has increased the number of input points. Loop systems have been built, intercompany tie-ins have been instituted and all these things combined with capacity loading of many lines have brought about the need for additional communications and control equipment to supplement the services of the telephone.

Late in 1945, radio was added to the communications system with the installation of fixed stations at Carthage, Shreveport and Sterlington, each with its group of mobile units in company cars and trucks. Since that time, fixed stations have been added at New Orleans and Lirette in the New Orleans district; at Bogalusa, Jackson and Gwinville in the Jackson district; and at Iowa in the Southwest Louisiana district; and an unattended relay station has been installed at Arcadia, La. Other radio installations are presently projected for two additional points in the New Orleans district. Mobile units only are also operating in the Houston and San Antonio districts and will be installed this year in the Wichita Falls district.

And now, to the aid of telephone and radio have come telemetering and remote control. Of course, various types of telemeters have been in use for a number of years.

Remote controls, too, have been used in individual plants like compressor stations and gasoline plants for some time. But it has been within comparatively recent months that installations like those in the New Orleans, San Antonio and Beaumont districts have demonstrated their value in maintaining dependable service under present day conditions.

New Orleans District

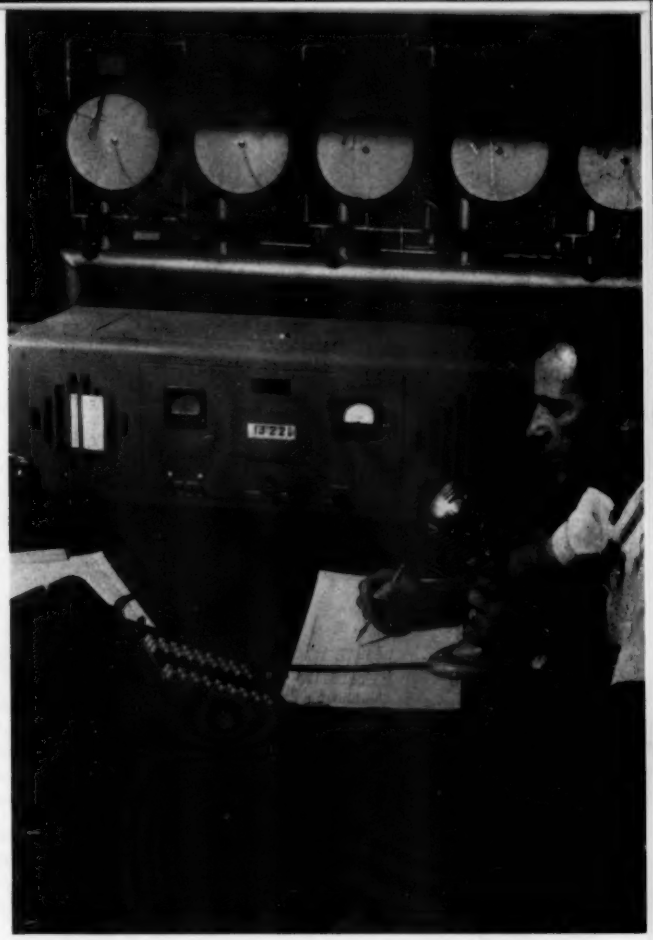
In the New Orleans district the central control point is at City Gate No. 1

Instrument panel at New Orleans City G
transmitters and remote co

HING MADE EASIER

REMOTE CONTROL

y United Gas News)



New Orleans city gate dispatcher is relaying by radio to the Jackson district pressures and deliveries on the Lirette-Mobile line that are transmitted to him from St. Rose by telemeter.

where the district dispatching office is located. Here, Metameter receivers provide a continuous record of pressure and flow conditions. Here also is the control switch by which operations at City Gate No. 2—on the opposite side of the city —are remotely controlled.

At St. Rose, upriver from New Orleans where lines from Lirette, Lake Long, DeLarge and other fields cross or tie into the Baton Rouge-New Orleans main line, three Metameter transmitters are installed to transmit pressure and differential on the Lirette-Mobile line and pressure only on the New Orleans line. The pressure transmitters are equipped with a cycle timer, switching from one pressure to the other every seven and one-half minutes and therefore requiring only one pen on the receiver at City Gate No. 1.

The St. Rose Metameters use two carrier telephone circuits on the Baton Rouge-New Orleans telephone line, one circuit for pressure transmissions and one circuit for the differential on the Mobile line. Also included in the St. Rose installations are two telephone carrier transmitters. One two-pen receiver for recording pressure and differential and two telephone carrier receivers at City Gate No. 1 complete the St. Rose installations.

In handling pressure and delivery readings at St. Rose on the Lirette-Mobile line, telemeter, radio and telephone communications are all brought into play. The New Orleans City Gate dispatcher gets both readings in his office as transmitted by Metameter from St. Rose. He relays them to Bogalusa, Gwinville and Jackson by radio. From Jackson, they are called in to the Shreveport general office dispatcher by telephone on the company line.

Equipment at City Gate No. 2 includes an instrument to transmit downstream pressure and volume of gas going into the system of New Orleans Public Service, Inc., a differential flow controller operated by remote control from City Gate No. 1, and a manually operated auxiliary regulator set to maintain 50 pounds pressure in the event of failure of the remote control equipment.

One two-pen receiver at City Gate No. 1 records pressure and differential readings from City Gate No. 2 which can be changed as needed by means of the two-way control switch. Two leased circuits are used for operation of the equipment in the two city gate stations.

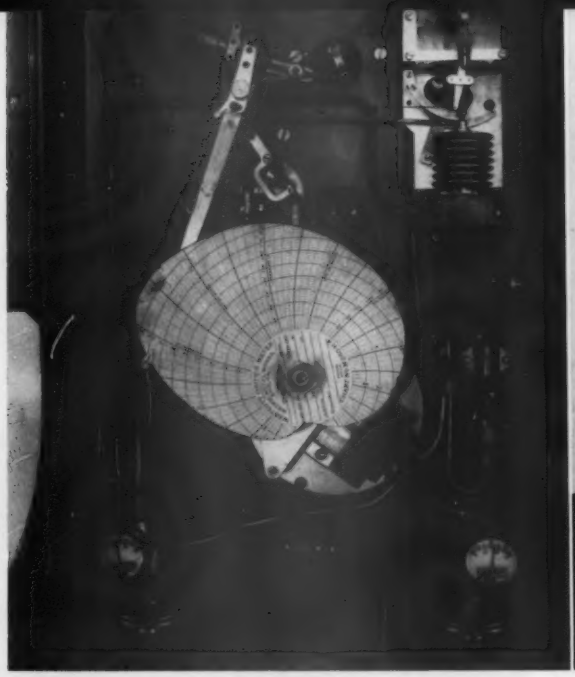
Pressure and differential on Barataria line are transmitted from an instrument at Aurora (across the Mississippi river from New Orleans) to a recording receiver at City Gate No. 1, one leased circuit being used for this equipment. These readings are essential for the purpose of controlling the amount of gas withdrawn from fields on the Barataria line.

A manual pressure control is set to maintain constant pressure on the Barataria-New Orleans main line. The California Company, with eight gas wells and a large volume of flare gas from oil wells, has a nine-mile, 12-inch gathering system and delivers gas at Barataria Common Point.

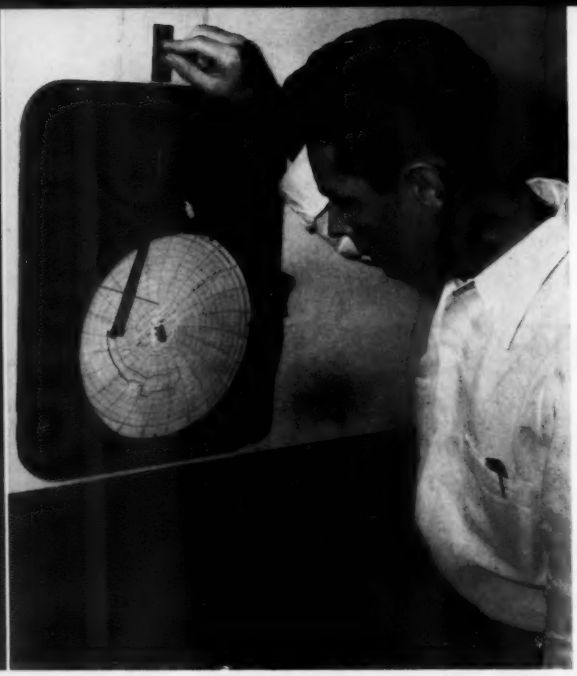
Each gas well flow line is controlled by a regulator into their gathering system so that, when the pressure drops, the regulators open, turning the wells on to hold the pressure in their system. When the pressure is rebuilt as required, the regulators close the wells off.

The flow into United's line is kept, from hour to hour, at or above the amount of flare gas. If this should not be done, pressure would build up in their system, causing flare gas to be vented to the air. The flow from the Barataria line is controlled by the dispatcher operating the remote control switch at City Gate

ans City Gate No. 2, showing Metameter remote control equipment.



Inside view of the instrument that changes the delivery of gas as required by the dispatcher. Picture at right shows operation of switch on the opposite end of the circuit.



A raise or cut in pressure can be put into effect at once. The dispatcher can watch results of the change —can immediately correct any excessive or deficient raise or decrease.

No. 1 to increase or decrease the flow as needed.

Additional telemeter and remote control equipment will be required in the New Orleans district upon completion of the 16-inch St. Rose-Bayou Barataria Tie-Over line now under construction.

San Antonio District

Telemetering and remote control regulation were inaugurated in the San Antonio district in conjunction with the district's expansion program last year. The new equipment is controlled from the district dispatching office at South Junction, and resultant pressures and flows are recorded on receiving instruments installed in the same office.

At Converse, where the new 20-inch line forms a junction with the old Pettus-Converse 16-inch line, and a new 20-inch line is extended five miles west to connect with the Bruni-Comal 18-inch and the new 16-inch loop lines, Metameters and remote control equipment are now in service.

A two-wire telephone circuit was constructed parallel to the new 20-inch line from Converse Junction to North Junction and extended to South Junction over Western Union poles. On this circuit, the regulators and meters are remotely operated.

At Converse Junction, the equipment is entirely shift frequency carrier operated and consists of a remotely controlled regulator to control pressure and flow from the Burnell-Converse 20-inch line into the Converse-New Braunfels 16-inch line for natural gas deliveries to Austin and intermediate points. The meter differential pressure for this flow is transmitted to a receiver at the South Junction dispatching office, and by use of a cycle timer, upstream and downstream pressures are transmitted at five and ten-minute intervals to another receiver located also at South Junction.

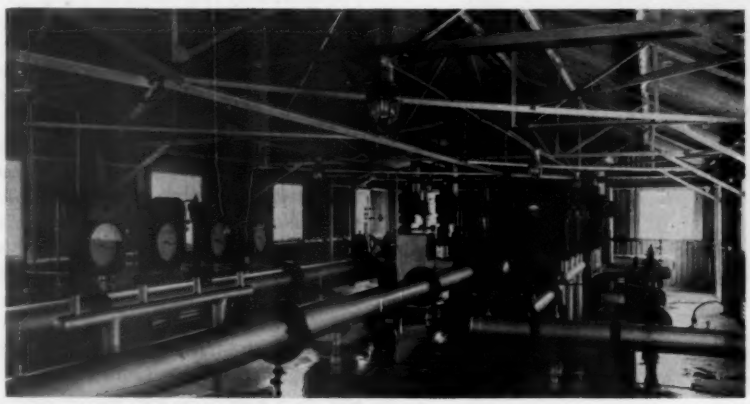
Also at Converse Junction, a remotely controlled regulator is in service to regulate the flow from the Burnell-Converse 20-inch line into the Converse Junction-North Junction 20-inch line which now serves to supplement the supply from the old Pettus-Converse 16-inch line.

At North Junction, a remote control, simplex-operated regulator controls pressure and flow from the Converse Junction 20-inch line into the South-Junction-Comal 18-inch line and the new 16-inch loop line. By shift frequency carrier the differential pressure for this flow is transmitted to a receiver at South Junction. By shift frequency carrier and a cycle timer, upstream and downstream pressures at this point are transmitted at five and ten-minute intervals also to the district dispatching office at South Junction.

Beaumont District

In the Beaumont district, through an arrangement of remotely controlled facilities, the flow of natural gas from Southwest Louisiana into the Beaumont district system at Call Junction can now be controlled from the district dispatching office at Nederland. This is remote control in a very true sense, for Nederland is approximately 50 miles from Call Junction.

To accomplish this near approach to



General interior view of New Orleans city Gate No. 2 meter and regulator station.

In the Nederland office, Beaumont district, the dispatcher works a switch to raise or lower pressures at Call Junction 50 miles away.

Beaumont district chief dispatcher inspects remote control equipment in the Nederland office by which pressure and flow are controlled at Call Junction.

automatic dispatching, it is necessary of course that the dispatcher at Nederland know the pressures on the Southwest Louisiana 14-inch line and on the Magasco-Port Neches line, and that he have some means of making changes in the setting on the regulator that controls the flow from Southwest Louisiana into the Beaumont district system.

To furnish required pressures to the Nederland dispatcher, Metameter sending units were installed at Call Junction. One sender was set upstream of the regulator on the Southwest Louisiana 14-inch and another on the Magasco-Port Neches main line, downstream of the regulator.

The sending units are comprised of a teleochrome motor geared to turn a spiral cam one complete revolution every 15 seconds, each unit having a zero-to-500 pound pressure element but having a small metal knob instead of a pen on the pen arm. The pen arm is positioned between a rocker arm and the spiral cam so that when the metal knob comes in contact with the turning cam, it moves the rocker arm.

The rocker arm is connected to a small magnet that actuates a mercury switch. When the metal knob on the pen arm is in contact with the spiral cam, the mercury switch is held open, and when it drops off the cam the switch is closed.

Since the cam turns at a constant speed and is so shaped that the ratio of the time the metal knob is in contact with it is in direct relation to the total travel of the pressure element, then the electrical impulse is in direct proportion to the actual pressure reading. In other words, with a 500-pound pressure element in the sender, to transmit a pressure reading of 250 pounds (one-half the total range) the metal knob would be in contact with the cam for 7½ seconds or half time, causing the mercury switch to be open half time and closed half the time required for one revolution of the cam.

To transmit the electrical impulses to Nederland and change them into readings on a chart requires a circuit from Call Junction to the district dispatching office, and for this purpose carrier circuits were installed on existing company telephone facilities. In the Nederland office, the receiving unit for electrical impulses transmitted from Call Junction has two recording pens, one for upstream and one for downstream pressure. The pens operate independently of each other and are controlled by a gear train and an electromagnet.

When the metal knob drops off the spiral cam at Call Junction the mercury switch is closed, the relay carrier is closed, the current is sent to the receiving carrier at Nederland, the receiving carrier actuates a relay that closes a circuit in a "Power Pack" energizing the electromagnet in the receiver and caus-

(Continued on page 42)

A scene in the Iowa dispatching office in the Southwest Louisiana district where radio has been added to the communications system.

Automatic Control System Governs Chicago City Sendout

By W. H. Isaacs and R. B. Paquette
The Peoples Gas Light & Coke Co., Chicago

THE gas distributed in the city of Chicago consists of a mixed gas of 800 Btu per cubic foot. This gas mixture consists primarily of natural gas at 1030 Btu and manufactured gas at 550 Btu.

The manufactured gas, called the base gas, is coke oven gas augmented by reformed natural gas or carburetted water gas, depending upon the season of the year or load on the system.

These natural and base gases are blended or mixed together in automatic gas mixing systems in the proper proportions to produce a standard 800 Btu mixture for distribution to the city system.

A gas mixing system should be automatic in operation, should follow load changes of both volume and discharge pressure rapidly without changes in proportioning the two gases, should be easily adjustable, and should be stable in operation.

The gas mixing system used for the city send-out is shown schematically in Figure 1.

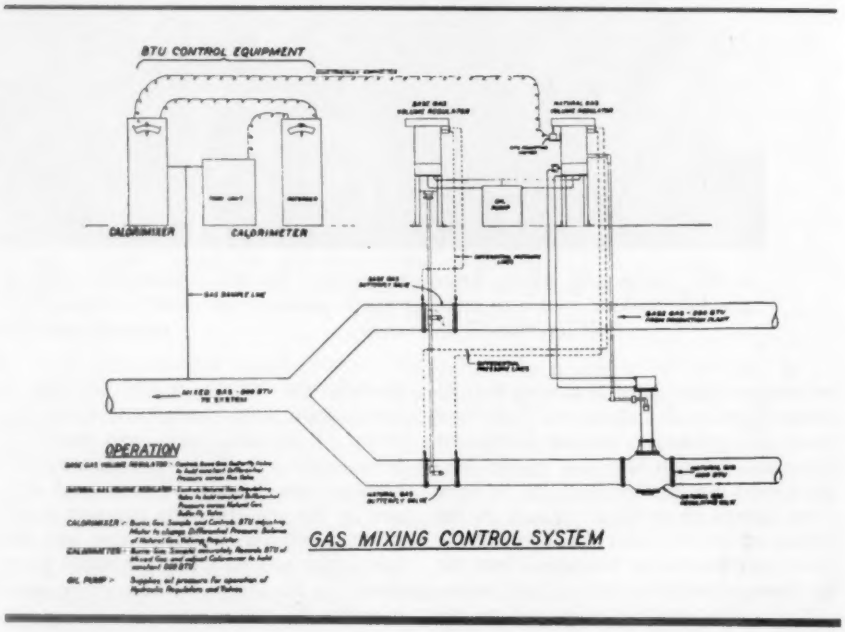


Fig. 1.

Gas Mixing System

This system consists of a base gas line installed parallel with a natural gas line. A butterfly valve is installed in each line and these two valves are linked together mechanically. The base gas butterfly valve and natural gas butterfly valves are called the metering valves, and their function is to meter the volumes of the two gases. The metering valves are operated by a base gas volume regulator. The base gas regulator operates from the differential pressure drop across the base gas butterfly valve.

The volume regulators are hydraulically operated by oil pressure at 90 psi from an electrically driven oil pump. A piston pump driven by natural gas pressure is arranged to cut in automatically to provide oil pressure in case of electrical failure.

The metering butterfly valves operate somewhat similar to an orifice meter. Therefore, they should be installed in straight runs of pipe, free from obstructions for approximately ten diameters upstream and five diameters downstream.

Mixer Operation

The base gas flows directly from the street compressors at approximately 10 psi through the base gas run of the mixer. As the demand on the distribution system changes, the volume of gas through the base gas butterfly valve changes. This produces a change in the differential pressure drop across the base gas butterfly valve. The base gas volume regulator is balanced to hold a few inches water column drop across this butterfly valve and, as soon as this pressure drop changes, the regulator moves the valve to restore the original pressure drop, thus the regulator moves the valve to hold a constant pressure drop across the base gas valve.

The natural gas butterfly valve is linked mechanically to the base gas valve; therefore, as the base gas valve moves, the natural gas butterfly valve moves with it through the same angle. This causes a change in the differential pressure drop across the natural gas butterfly valve. The natural gas volume regulator is balanced to hold a few inches pressure drop across the natural gas valve. As soon as this pressure drop changes, the natural gas volume regulator moves the natural gas regulating valve to restore the original pressure drop. Thus, the natural gas regulator holds a constant pressure drop across the natural gas valve.

This system of valves and regulato- will thus follow load changes readily and hold a constant proportion between the two gases, without regard to changes in Btu or specific gravity of the base or natural gases.

To correct for these changes a sample of the mixed gas is passed through a calorimeter and calorimixer to determine its Btu. The calorimixer burns the gas sample and automatically operates a

Presented at meeting of Operating Section, American Gas Association, New York, May 1950.

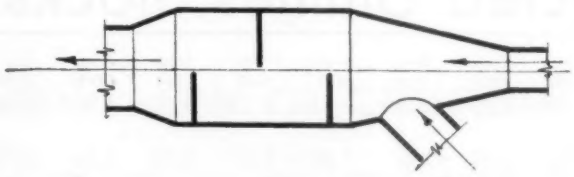


Fig. 2. Baffle mixing chamber.

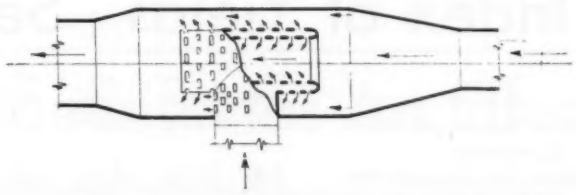


Fig. 3. Torus mixing chamber.

Btu adjusting motor, which changes the differential balance of the natural gas regulator. This changes the natural gas flow slightly to hold a constant 800 Btu in the final mixture. The calorimixer gives a fast sample in approximately 30 to 45 seconds, thus providing rapid Btu adjustment. This instrument is set to hold a constant zero point. The calorimeter burns a gas sample and gives a Btu record in six to eight minutes. The calorimeter continually supervises the calorimixer to hold its zero setting at 800 Btu.

The gas mixing control system, controlled by the calorimetric equipment, will hold the Btu of the final mixture to within .5 per cent, which is the guaranteed accuracy of the calorimetric equipment.

This system operates on the discharge side of the street compressors and delivers the gas mixture directly to the distribution system at the system pressure.

The natural gas enters the mixer at 90 psi and the pressure is reduced to distribution system pressure through the natural-gas regulating valve. This system is very stable in operation and has an operation range of approximately 10 to one in volume.

Gas Sampling

It is important that the gases be well mixed before they enter the distribution system and, also, that a well mixed sample be supplied to the calorimetric equipment which controls the mixer.

In order to insure a well mixed sample, the sampling point should be sufficiently remote from the mixer to allow time for mixing. The sample line should be as short as possible and of small size to avoid introducing a time lag in the sampling.

Mixing Chambers

If the plant piping system permits the sampling point to be installed sufficiently remote from the mixer, then the gas mixing will take place in the plant piping. However, in some installations the sampling point must be fairly close to the mixer and a mixing chamber must be installed to insure a well mixed gas.

A common type of mixing chamber consists of an enlarged section of piping with baffles installed inside to provide a tortuous path as in Figure 2. This baffle chamber insures a well mixed gas, however, it has the disadvantage of introducing a relatively high pressure drop in the system.

In order to reduce this objectionable pressure drop, a Torus type mixing chamber was built as in Figure 3. This mixing chamber consists of a ring made by a 24-inch pipe welded inside of a 30-inch pipe.

The ring or torus was then welded to an inlet 30-inch pipe. Slotted openings were cut into the ring. The total area of the slotted openings was 70 per cent greater than the area of the inlet 30-inch pipe. The whole ring tee assembly was then welded into an enlargement of the discharge line.

This mixing chamber offers very little resistance to the gas flow. The gas from one stream meets a large number of small jets of gas from the other stream, so that good mixing occurs in a very short time. This mixing chamber has given good results over very wide ranges of flow.

Installation

The natural gas enters the mixers at 90 psi and is reduced to distribution system pressure through the natural gas regulating valve. This reduction in pressure is accompanied by much noise and, at high flow rates, this noise may become very objectionable.

A noise level of 122 decibles was measured on one installation. This noise level is above the feeling level and may actually induce pain as well as being objectionable over a large area.

Underground Installation

In order to reduce this noise level and achieve quiet operation, it is advisable to install the piping and regulating valves for the mixing system underground. This allows the surrounding ground to absorb the noise vibrations. A typical installation of a gas mixer with underground piping is shown in Figure 4. The regulating and butterfly valves are installed in pits and operated by regulators mounted in a building directly above them.

Some attempts have been made to soundproof mixers which are installed above ground. To reduce th noise level on these mixers, a layer of rock wool insulation three inches thick was installed around the piping and then covered with 24-gauge galvanized sheet metal. This method of insulating the piping and valves reduced the noise level to a point that was not objectionable in an industrial area; however, it is not as effective or would not reduce the noise to the level that could be obtained by installing the valves and piping underground.

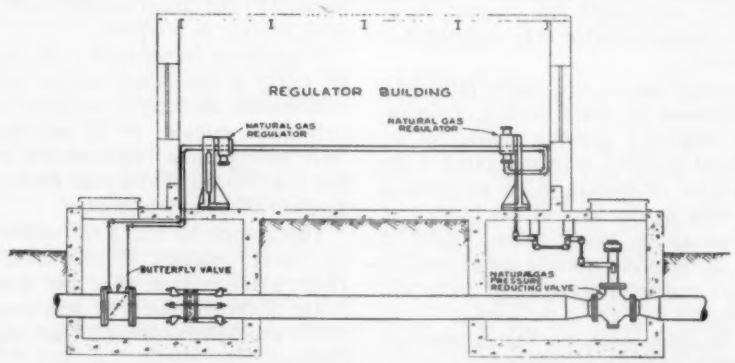


Fig. 4. Typical installation of gas mixture with underground piping.

Index of Yields : Selected Utilities Stocks

	June 1950	May 1950	Apr. 1950	Mar. 1950	Feb. 1950	Jan. 1950	Dec. 1949	Nov. 1949	Oct. 1949	Sept. 1949	Aug. 1949	July 1949
Natural Gas Transmission Companies	4.86%	4.70%	4.77%	4.57%	4.83%	5.02%	4.75%	4.85%	5.15%	5.25%	5.38%	5.53%
Natural Gas Transmission & Distribution Companies	5.29	5.11	5.14	5.19	5.26	5.23	5.26	5.58	5.61	5.73	5.62	5.72
Manufactured & Mixed Gas Companies	4.98	4.66	4.77	4.71	4.75	4.62	4.75	4.94	5.07	5.16	5.40	5.22
Class "A" Electric Companies	4.94	5.13	5.24	5.15	5.38	5.40	5.48	5.49	5.53	5.58	5.74	5.86
Class "B" Electric Companies	5.58	5.30	5.37	5.42	5.37	5.47	5.68	5.77	5.96	5.72	5.89	6.02

Method of Compiling Index of Yields

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

The companies used in compiling this index are:

Natural Gas Transmission Companies: El Paso Natural Gas Co.; Northern Natural Gas Co.; Panhandle Eastern Pipe Line Co.; Southern Natural Gas Co.; Tennessee Gas Transmission Co.

Natural Gas Transmission and Distribution Companies: Columbia Gas System, Inc.; Consolidated Natural Gas Co.; Lone Star Gas Co.; Oklahoma Natural Gas Co.; Pacific Lighting Corp.

Manufactured and Mixed Gas Companies: Bridgeport Gas Light Co.; Brooklyn Union Gas Co.; United Gas Improvement Co.; Peoples Gas Light & Coke Co.

Class "A" Electric Companies: Boston Edison Co.; Commonwealth Edison Co.; Houston Lighting & Power Co.; Southern California Edison Co., Ltd.

Class "B" Electric Companies: Dayton Power & Light Co.; Hartford Electric Light Co.; Pennsylvania Power & Light Co.; Public Service Co. of Colorado; San Diego Gas & Electric Co.

John F. Falvey

VIRTUALLY all sections of the AMERICAN GAS JOURNAL index showed fairly sharp widening of yields during the past month.

Explanation for this does not rest with the utility industry, since news emanating from both the electric and gas divisions has been on the favorable side and prospects continue promising.

One need not look any further than the stock market itself for the obvious answer. During recent weeks the market has shown brief but sharply weakening tendencies. While each reaction to date has been followed by recovery periods, the pattern reflects the caution which has been seeping into an increasing proportion of investment quarters.

This is indicated in a cross-check which has just been made of some of the leading market observers in Wall Street firms. None express themselves as outstandingly bearish; but most of them see certain factors in the outlook which might, and probably will, have a dampening effect on share prices some months hence.

While most observers are agreed that a reaction in share prices should prove to be only a temporary setback in a long range upward movement, the mere threat of a drop in prices, however short, has had a disturbing effect on the investing public. Their sales recently have sharply exceeded purchases.

A development born of caution has been the increasing selectivity of investors between the stocks of different industries. Quality stocks have been in the vangard of purchases, while secondary issues numbering into the hundreds have been laggards.

Promising growth industry stocks—such as those in the chemical and television industries—have been giving the better account of themselves, while those with clouded long range outlook, such as railroads, have been under pressure and forced to give ground from their previous high levels.

In the maelstrom the utilities, whose chief promise is for stable profits and dividend return, have found themselves neglected. Both the electric and gas utility industries enjoy promising prospects so far as concerns continuing expansion in load and in operating revenues. The question in investors' minds is whether the companies because of regulation and rate pressure will be able to reflect in net earnings any significant proportion of the increases expected to be registered in revenues.

Investor concern over utility prospects, as expressed by stock market commentators and by a growing number of investment analysts, is unwarranted if the experience of leading utility companies, especially in the natural gas branch of the business, is any criterion. Profits of these companies currently are expanding sharply and returns for all of 1950 will be considerably about the level of a year ago. In some cases, the higher earnings will mean increased dividends.

That the stock market is not immune to good news was shown in the favorable reaction accorded the stock of General Motors Corp. following recent announcement of the company that it would split the stock two for one. Market observers look for a number of other stock splits before the year-end, with the result that the number of corporate stockholders may increase, in their estimation, by as much as 15 per cent within a year.

Swelling the list are trustees of pension funds and of institutional portfolios which are forced into the stock market to obtain greater return on their invested funds in an effort to keep income abreast of fast-climbing costs, or reasonably close to them.

Management Must Have Money

RAISING of needed new corporate funds through sale of equity stock continues to be a difficult process, and one which has become further complicated by the recent unsettlement of the stock market as a whole.

Pointing up the problem is the fact that all utility companies—straight electric, combination and gas companies—raised only $163 million, or 22 per cent, of their new money requirements in the first five months of this year through the medium of common stock.

This compared with $337 million (24 per cent) obtained in this manner in 1949; $104 million (8½ per cent) in 1948; $106 million (18 per cent) in 1947; and $24 million (20 per cent) in 1946.

Even more unimpressive has been the

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New Law of Eminent Domain Has An Effect On Gas Corporations

by Leo T. Parker
Attorney at Law, Cincinnati

THE NEW and late higher courts hold that the right of eminent domain is an attribute of sovereignty and is vested by legislative action in subdivisions of the state, and in private corporations devoted to uses in which the public has a right to share. A proposed use of private property for public benefit is a matter for judicial determination. In other words, under no circumstances may a jury decide whether a city or gas corporation may condemn and appropriate private property. The necessity, propriety, or expediency of appropriating private property for public use, the amount of private property and its location and also its suitableness for the proposed use are all legislative questions.

Another important point of law is that the final determination of eminent domain by one of those authorized by state laws to make the decisions is final, in the absence of fraud, bad faith or abuse of discretion. For late and leading higher court decisions supporting these points of law see Denver v. Board of Com'rs, 113 Colo. 150; United States v. Meyer, 113 F. (2d) 387; Perry v. Thomas, 82 Utah 159; and Dist. of Chicago, 218 Ill. 286.

Also, see the case of City of Eugene v. Johnson, 192 Pac. (2d) 251, reported May 1948. In this case a city filed suit to appropriate approximately 51 acres of land owned by one Johnson. It was decided by an authorized committee that the land was needed for "public purposes." The city tendered into court $2,500 which its officials alleged was the reasonable value of the land sought to be appropriated.

Johnson contested condemnation of his land on the contentions that (1) the city does not require the complete 51 acre tract; and (2) other sites are available and more appropriate; and (3) the land is worth $27,795 instead of $2,500.

The higher court promptly held that the city's officials or committee authorized by state laws could without doubt determine the location and quantity of the land needed by the city, but the jury must decide its value. The court said:

"The necessity for the taking of property is a question of law for the court and not one of fact to be decided by the jury, and, if it is made an issue, it should be settled by the court before the jury is impaneled."

Jury Must Use Own Judgment

Considerable discussion has arisen from time to time over the legal question: Is a jury obligated to consider testimony given by experts as to the value of land appropriated for public or gas purposes? The answer is no.

For example, in Cities Service Gas Co. v. Williams, 198 Pac. (2d) 204, reported January 1949, it was shown that a gas pipe line was laid in an 82.5 foot right of way on a private farm of 480 acres. The commissioners appointed to appraise the damages assessed the damages to the land at $375 and the damages to the crops at $30.

The farm owner appealed to the higher court. Several expert witnesses testified regarding the damage to the farm caused by elements entering into the depreciation in the market value of the land as: (1) erosion caused by digging the ditch, which was from six to eight feet deep, and leaving on top the infertile sub-soil, (2) damages caused by patrolling the line in cars and trucks which had been done at frequent intervals, (3) danger from leaks which had occurred in several places on the farms, and (4) the leaving of pipe, chunks of oak timber and asphalt on the land both on and off the 82.5 foot right of way. The court instructed the jury that the experts' opinions as to value of the property involved was *not* binding on the jury, and that the jury could reach its own conclusions from all the evidence and entirely disregard the experts' opinions. The jury followed these instructions and awarded the farm owner the sum of $1,175 plus $460, as damage to the crops. The gas company appealed the case, but the higher court held the jury's verdict valid and enforceable, saying:

"The credibility of witnesses and the weight to be given their testimony on direct and cross-examination is for the jury to determine."

Public Use Defined

A great deal of controversy has arisen in the past over the legal meaning of the term "Public Use." It is well known, of course, that private property can be appropriated for public use or purposes but the question still is before the courts in many different localities, as follows: What is a public use and what kind of private property can be condemned or appropriated for gas purposes?

According to a recent higher court any private property, including office buildings, may be condemned for purposes of distribution of gas as well as ordinary real estate. This is so because the courts recognize the fact that eminent domain is the right or power of private corporations, municipal corporations, states, counties, etc. to take private property for public use based on the right of the sovereign to condemn private property and appropriate the ownership and possession upon paying the owner reasonable compensation.

For example, in City of Knoxville v. Heth, 210 S. W. (2d) 326, it was shown that officials decided to condemn a business and office building adjoining its general gas administrative offices. This decision was made because the city needed additional office space where records, supplies and equipment are kept, bills are paid, the Board meets and other officials of the gas system attend to their business.

The owner of the condemned office building filed suit and asked the court to prohibit the city from appropriating the building. The owner of the building argued that the need of the city for the office building was not for a "public purpose" or "public use" within the meaning of eminent domain laws. The higher court held that the city may condemn and appropriate the office building. The court said:

". . . The term 'public use' is not capable of exact definition, but is elastic, in order to keep pace with changing con-

ditions. Moreover, views as to what constitutes a public use necessarily vary with changing conceptions of the scope and functions of government. As governmental activities increase with the growing complexity and integration of society, the concept of 'public use' naturally expands in proportion. . . . It thus seems to us that this building will be a 'public building' for a 'public use.' . . . It will be wholly owned, operated and conducted for the public benefit. . . . We have concluded that the acquisition sought is for a 'public use.' "

Also, see the case of Springfield Gas Co. v. City of Springfield, 257 U. S. 66. Here the Supreme Court of the United States said:

"The test of public use is not based upon the function or capacity in which the use is furnished. The right of the public to receive and enjoy the benefit of the use is the determining factor whether the use is public or private."

Contract Purchaser

According to a recent higher court, a company producing gas from its own property, and which transports and sells gas to a single purchaser is not in business of "buying and selling natural gas," and therefore cannot appropriate private property under the laws of eminent domain.

For illustration, in Michigan Consolidated Gas Co. v. Sohio Petroleum Co., 32 N. W. (2d) 353, reported July 1948, it was shown that the Sohio company is the owner and operator of a natural gas pipe line used for transporting natural gas from wells which it owns and operates. A suit was filed and the higher court was asked to grant an injunction against approval of the construction of a new pipe line. This company had not obtained approval of its pipe line from the public service commission nor had it received a certificate of public convenience and necessity. It was contended that Sohio is within the jurisdiction of laws that regulate gas companies which buy and sell natural gas for public purposes and benefit. The higher court refused to grant the injunction, saying:

"Sohio is not a corporation . . . required to obtain commission approval of its pipe line. . . . If, as disclosed by the proofs, Sohio's sole operations in this connection consist of producing gas from its own wells, piping and transporting and selling it to a single contract purchaser, it cannot be said that Sohio is engaged in the business of buying and selling natural gas."

No Allowance for Emergencies

Considerable discussion has arisen from time to time over the legal ques-

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Natural Gas Invades Knoxville Area

WITH Vice-President Barkley as the principal speaker, his new wife the undisputed feature attraction, and Wade V. Thompson, President of East Tennessee Natural Gas Co., pictured in the role of hero of the achievement, a thousand or more political dignitaries and plain citizens assembled for the public dedication ceremony marking the advent of natural gas into the Knoxville area on Saturday June 17.

In addition to Mr. Thompson, who replied to the welcoming address of Mayor James W. Elmore, of Knoxville, speakers from the gas industry included Edward P. Noppel, vice-president of Ebasco Services, Inc., and Willard F. Rockwell, chairman of the board of Rockwell Manufacturing Co. Former Governor Jim McCord acted as master of ceremonies.

When completed the 465 mile loop pipe line system will cost approximately $30 million and will serve some 30 eastern Tennessee communities in addition to the larger cities of Knoxville and Chattanooga. The line will carry a high industrial load, as there are 700 manufacturing plants, large and small, in the Knoxville and Chattanooga areas. Principal customers in the industrial class are Aluminum Corp. of America at Alcoa, and the Atomic Energy Commission at Oak Ridge, Tenn.

The northern loop of the system, rushed through to completion in less than a year to bring natural gas to the Oak Ridge plant, consists of 165 miles of 22 inch line. The lower loop, which will serve Chattanooga, Alcoa and smaller communities along the way, is to be 135 miles of 12¾ inch pipe. Gas for Knoxville is made available through a short lateral off the Oak Ridge line. The ultimate peak load of the combined lines is now envisioned as 166 MM cu. ft. per day, and the system capacity with presently planned compressor equipment will be 183 MM cu. ft.

Wade Thompson, who is universally credited with fighting the newest project through to completion, was one of the original organizers of the Tennessee Gas Transmission Co., trunkline supplier of gas to the East Tennessee line. Ebasco Services, Inc., New York, designed and supervised construction of the line, with E. K. Williams as construction manager.

In addition to construction work which is going ahead on the unfinished lower loop of the East Tennessee project, the company anticipates favorable action on an application to be placed before the Federal Power Commission, whereby it will be authorized to build an additional 100 miles of 16 inch, from a point where the two lines join, slightly east of Knoxville, to Bristol, Tenn. If this extension is completed it will introduce natural gas service for the first time to an additional ten communities close to the North Carolina and Virginia borders.

Vice-president Barkley ignites the first natural gas to be burned in the Knoxville area, as Mrs. Barkley and Wade Thompson give smiling approval.

The gas utility in the city of Knoxville is a municipal operation, under the jurisdiction of the Knoxville Utilities Board, which also supplies electric and water service. Conversion from 660 Btu manufactured gas to 1050 natural will be started July 1, and the board expects to have the 6,500 customers on its lines all on straight natural gas within 60 days. The city is being divided into 24 sections for conversion purposes. All the work will be handled by local crews, and the present estimate of the cost is between nine and ten dollars per meter.

Enthusiasm for natural gas is at a high pitch throughout the whole east Tennessee area, as evidenced by the strong newspaper and radio support given the dedication ceremonies. Public relations representatives of East Tennessee Natural Gas Co., handling the details of the dedication ceremonies, were Albert Frank-Guenther Law, New York advertising and publicity agents.

Vulcan Proofing Changes Name To Vulcan Rubber Products

Vulcan Rubber Products, Inc., is the new name of Vulcan Proofing Co., Brooklyn.

An announcement said that the change was made to bring the name of the company "into closer accord with the products manufactured." It continued: "We are still the same people and the same organization."

News of the Gas Industry

Servel to Fight Govt. Charges

The Justice Department announced on June 12 that it had filed suit in Federal court in Philadelphia, against Servel, Inc., Evansville, Ind., charging conspiracy in restraint of trade in monopolizing interstate and foreign commerce in the manufacture and distribution of gas refrigerators.

The government asks that the court declare Servel contracts with the Swedish owners of the basic patents cancelled and all contracts between Servel and its 790 distributors terminated. It further asks that the defendent be enjoined from requiring distributors to sell Servel refrigerators exclusively or at prices fixed by the manufacturer.

A statement issued by Louis Ruthenburg, Chairman of the Board of Servel, said, in part: "It is ridiculous for the anti-trust lawyers in Washington to claim that Servel has any monopoly on the highly competitive household refrigeration business . . . there are at least a dozen large manufacturers aggressively in the market with refrigerators in all types, sizes and prices." Criticizing the action of the Justice Department in filing the suit in Philadelphia, Mr. Ruthenburg said: "The public will note that the anti-trust lawyers have again followed their practice of filing a civil suit at an unreasonable distance from a company's operations."

Further legal complications were added to Servel's problem when on June 21 a Federal grand jury in Pittsburgh, Pa., returned an indictment charging the manufacturer and seven gas companies in the area with price fixing. Servel takes the position that it has never been the company's policy to fix prices to the public, and the action will be defended vigorously.

Milwaukee Makes Mikula General Sales Manager

Jack H. Mikula, an employee of the Milwaukee Gas Light Co. for 20 years, has been named general sales manager of the company. Announcement was made on June 1, by B. T. Franck, vice-president in charge of sales, who said that Mr. Mikula will also serve as his assistant.

Mr. Mikula, while attending the University of Wisconsin, from which he graduated in 1933 with a bachelor of science degree in civil engineering, was employed during vacation periods by the gas company. He was given a cadet engineer's post and worked in the various departments of the utility until 1939 when he was made supervisor of refrigeration service and installation.

Later he held the positions of refrigeration engineer in the commercial sales department; and assistant manager of the industrial and commercial department, with supervision over sales, installation and service of gas fired equipment.

He is a member of the faculty of the College of Engineering of Marquette University.

Ginna Is Now Executive V-P of Rochester G & E; East, V-P Operations; Howe, V-P Comptroller

R. E. Ginna

Leo H. East

Promotions of three executives of the Rochester Gas and Electric Corporation, Rochester, N. Y., have been announced.

Robert E. Ginna, formerly vice-president in charge of sales and regulatory matters, becomes executive vice-president, a new position with the company.

Ernest J. Howe adds comptroller to his title of vice-president in charge of finance.

Leo H. East, formerly general superintendent of the gas division, has been made vice-president in charge of operations.

Mr. Ginna came to Rochester in 1930 as a consultant on depreciation, valuation and rate matters. Later he was named assistant to the President, and in 1945 he became a vice-president. In 1948 he was elected a director of the company.

Mr. Howe is a graduate of Denver University and Columbia University School of Business, and has had more than 25 years' experience in utility financing.

Mr. East graduated from University of Rochester and has been in the gas department of RG&E for 26 years.

Other promotions announced include:

Sydney Alling, former manager of industrial and commercial sales now becomes general sales manager, a new post.

Associated with Mr. Alling will be Walter McKie, as manager of domestic sales; R. DeWitt Pike, as manager of industrial and commercial sales; J. Gordon Ross, as manager of customer relations and service; and Donald K. Smith, as manager of gas space heating sales.

Texas Proposes Dredging Lines Under Mississippi

Texas Gas Transmission Corp. plans to dredge two trenches—20 feet deep—underneath the Mississippi River for two new 20-inch submarine crossings near Greenville, Miss. This will be the first time natural gas pipe lines will be laid in this manner under the Mississippi in the Greenville area.

The company has asked the Federal Power Commission for emergency authorization for the project so that construction can begin promptly and be completed by Nov. 1.

A company spokesman explained that the dredging operation has been made possible by the development of equipment that can handle the Mississippi's excessive depth and swift current at that point. Cost of the project is estimated at $1,460,000.

The plans call for dredging the two 20-inch lines to a depth of approximately 20 feet below the bottom of the river.

Thomas V. Flynn Dies

Thomas V. Flynn died on June 16 in Philadelphia after a brief illness.

Mr. Flynn entered the employ of the Philadelphia Gas Works in 1903 as a fitter. He progressed steadily and finally was made superintendent of the Germantown and Frankford shops before the department was merged into one unit in 1932. At that time, he was made superintendent of the street division.

He was retired on April 1, 1948.

Pipe Lines Still After Carolina Market

Transcontinental Gas Pipe Line Corp., Houston, Texas, has applied to the Federal Power Commission for authorization to install a total of 33,600 additional horsepower at authorized compressor stations on its Texas-to-New York city pipe line in order to make natural gas available in North and South Carolina.

Transcontinental proposes to deliver the additional gas to Piedmont Natural Gas Co. and Public Service Co. of North Carolina, for resale in the Carolina area. Both of these latter companies now have applications pending before FPC for authorization to build lines extending into the Carolinas from the Transcontinental system.

Transcontinental's application seeks authority to sell and deliver to Piedmont an amount not exceeding five million cu. ft. of natural gas per day during the first year of service, up to 11 million cu. ft. the second year, and not to exceed 22 million cu. ft. thereafter. Public Service Co. would receive up to 2,500,000 cu. ft. per day the first year, up to 5,500,000 cu. ft. the second year, and an amount not to exceed 11 million cu. ft. per day thereafter.

Estimated cost of Transcontinental's proposed additional facilities is $5,339,400.

Another company, Carolina Natural Gas Corp., has an application pending before the Commission for authorization to construct a project similar to those proposed by Piedmont and Public Service Co. Carolina Natural has asked the FPC to order Transcontinental to supply gas for its proposed system in North and South Carolina.

Piedmont Natural Gas Co., Inc., a new corporation of Spartanburg, S. C., has filed an application with the Federal Power Commission proposing to build and operate pipe line facilities designed to carry natural gas to markets in North and South Carolina.

The proposed project would include six short lateral pipe lines, aggregating approximately 73.7 miles in length, extending from Transcontinental Gas Pipe Line's main line to city gas distribution systems in North and South Carolina.

Piedmont said it has entered into a contract to purchase the gas plants and distribution systems of Duke Power Co. in Charlotte, Winston-Salem, Greensboro, Salisbury, Spencer, High Point, Burlington, Graham and Mount Airy in North Carolina and Greenville, Spartanburg and Chester in South Carolina. The proposed Piedmont project would supply natural gas to each of the communities except Chester and Mount Airy.

W. M. Henderson of So. Calif. Retires After 26 Years

W. M. Henderson, patriarch of the Pacific Coast gas industry and superintendent of distribution for the Central Division of Southern California Gas Co., completed a gas industry career which began in 1902, on June 1, when he went into retirement after 26 years' service with the Southern California Gas Co. and the Los Angeles Gas and Electric Co.

Starting as an office boy with the California Central Gas and Electric Co., Mr. Henderson held a number of positions until he became gas distribution engineer for the entire Pacific Gas and Electric Co. system. He held this position in 1924 when he became affiliated with LAG&E, which company was later merged with Southern California Gas Co.

Work on 3rd Line to Chicago Starts Immediately

With the granting of a certificate of public convenience and necessity to Texas Illinois Natural Gas Pipeline Co. by the Federal Power Commission on June 14 to cover the construction of a natural gas pipe line from the Gulf Coast area of Texas to Joliet, Ill., work on the new project will get under way immediately, according to James F. Oates, Jr., chairman of the board of Texas Illinois, an affiliate of The Peoples Gas Light and Coke Co., of which Mr. Oates also is chairman. Texas Illinois will operate the new pipe line which, when completed, will be more than 1300 miles in length.

The current estimate on the cost of the line is approximately $117,000,000. Mr. Oates said that present plans call for completion of this third pipe line to the Chicago area by the 1951-1952 heating season.

Initial daily delivery capacity of the new gas transmission system will be 305,000,000 cu. ft. of natural gas. The line will be 30 inches in diameter and is expected to be initially powered by three compressor stations to be erected at equal intervals along its route. These stations will generate 8,000 horsepower.

The capacity of the new pipe line, Mr. Oates stated, can be increased to 517,800,000 cu. ft. per day, and it is planned to reach this capacity ultimately. He said before this top capacity can be realized, Texas Illinois must first acquire more gas reserves and construct additional compressor stations along the line.

The southernmost tip of the third line will originate in the La Gloria gas field which is located about 250 miles southwest of Houston, Texas. Another source of gas will be from the Blucher and Tijerina fields, adjacent to and just north of the La Gloria field. Two other sources of gas for the new line will be the Old Ocean and Chocolate Bayou fields, situated about 60 miles south of Houston.

The route taken by the new pipe line will be in a northeasterly direction from the La Gloria field, through the states of Texas, Arkansas, the southeastern corner of Missouri, and up the center of the state of Illinois to Joliet. It will cross five major rivers in Texas, six in Arkansas, the Black and St. Francis rivers in Missouri, and the Mississippi River between Missouri and Illinois. Four of these rivers will be crossed by suspension bridges, including the Mississippi.

Mr. Oates said, "The project will be carried out under the direction of the management of Natural Gas Pipeline Co. of America, another of our affiliates, which operates the present 900-mile dual pipe line system extending from the Texas Panhandle to the Chicago area. Peoples Gas has been receiving natural gas from this system for the past 20 years and will continue to do so. The added supply from the new Texas Illinois line will help meet the demands for gas in Chicago and other communities served

Koppers to Build Coke Ovens For Carnegie-Illinois

Construction of two new coke batteries of 87 ovens each at Clairton Works of U. S. Steel's Carnegie-Illinois Steel Corp., replacing two batteries of old ovens, has been scheduled. Contract for the work has been awarded Koppers Company, Inc.

Actual construction of the first new battery is expected to get underway early in September, with work on the second starting about 60 days later. The batteries are scheduled to go into operation about one year after the start of construction work.

The new byproduct ovens will be of the underjet type, designed for coke-oven gas heating, with re-circulation of waste gases. The batteries will carbonize 5,000 tons of coal every 24 hours, yielding approximately 3300 tons of coke in the same period.

Clairton Works contains 1,567 ovens.

Cooper-Bessemer Develops New Supercharger

The largest capacity engine superchargers ever to be produced in this hemisphere are now being built by The Cooper-Bessemer Corp. at its plant in Mount Vernon, Ohio. Designed specifically for Cooper-Bessemer engines, the new superchargers are of such size and design as to handle the requirements of any gas or diesel engine from 1200 hp to 2500 hp, according to Ralph L. Boyer, Cooper-Bessemer vice-president and chief engineer.

"Cooper-Bessemer's decision to manufacture engine superchargers results from its inability to secure superchargers of such large size in this country," explained Mr. Boyer. Experience with exhaust driven superchargers dates back to 1935 when such superchargers were first introduced in this country by a European manufacturer and installed on Cooper-Bessemer equipment.

by customer companies of Natural Gas Pipeline.

"While our present estimates show that it will require more than a year to construct the new line," Mr. Oates continued, "it will take the natural gas only four days to travel the 1300 miles from the south of Texas to the Chicago area."

'Television Matinee' Is New Show Of Philadelphia Gas Works

A new home service type of video entertainment was introduced recently when The Philadelphia Gas Works Co. launched a new series of "PGW Television Matinee," shows over Station WPTZ.

Billed as "television's newest and most interesting daytime show for the ladies," it is being presented every Thursday at 3:00.

Entertainment is the keynote of the show, which features a master of ceremonies surrounded at various times by well known chefs, *maitres d' hotel,* prominent guests, musicians and tiny tots. Even the studio audience joins in the fun, and the result is a fast-moving half-hour of enjoyable TV.

The setting for the show is a modern gas kitchen equipped with a fully-automatic, six-burner Caloric gas range, and a Servel gas refrigerator. The Caloric Stove Corp. participates in the show as a co-sponsor.

The commercial aspects of "Television Matinee" are given major emphasis when the gas appliances are demonstrated, and when audio-visual plugs on the advantages of gas are televised.

Such well known gourmets as Victor Tarrello, the Chestnut Street restaurateur, and John Ballaguer, chef at the Ritz Carlton Hotel, were on hand to tell the MC, Pete Boyle, how they have depended on gas for many years to cook food that met with their exacting requirements.

Visiting celebrities and well known local personalities will be "guest starred" from time to time on "Television Matinee."

Rockwell Appoints Muehlberg Gas Sales Manager

C. E. Muehlberg

A. J. Kerr, vice-president of sales for meter and valve division, Rockwell Manufacturing Co., Pittsburgh, has announced the appointment of Clarence E. Muehlberg as sales manager of gas products.

In his 30 years' affiliation in the gas utility field, Mr. Muehlberg has had various experiences ranging through coal and water gas manufacture, gas works and electric station construction, distribution construction and maintenance, consumer appliance service, domestic, commercial and industrial sales management.

He started with the Public Service Co. of Colorado, becoming sales manager of the industrial gas department. For many years following he was associated with the Consolidated Edison Co. of N. Y. and attained the position of assistant manager of station construction and shops department.

Vincent Gaudio Forms New Brooklyn Meter Works

Vincent Gaudio, formerly associated with Lambert Meter Co., now is head of a new company manufacturing tin-plate gas meters, with office and plant at 3908 Fourth Ave., Brooklyn.

The company is a partnership between Mr. Gaudio and his sons, Dante and Solo Gaudio, and operates under the name of Brooklyn Meter Works. Initial production will be 100 five-light meters per day.

Ferdinand Ferraro is in charge of general management and sales supervision.

Seitz Becomes Sales Manager Of Southern Counties Gas

The position of manager of sales of Southern Counties Gas Co., left vacant by the recent death of Floyd S. Parmenter, has been filled by appointment of Frank N. Seitz to the post, according to Arthur F. Bridge, gas company President.

The new sales manager comes to Southern Counties Gas Co. from its affiliate, Southern California Gas, where he held the position of general supervisor of appliance sales and promotion. He has been in the gas business in Southern California since 1939, with time out during the war for military service.

Van Ackeren Retires at Koppers And Carvlin Moves Up

Joseph van Ackeren, vice-president and assistant general manager, engineering and construction division, Koppers Company, Inc., has announced his retirement. Mr. van Ackeren, a widely known engineer in the coke oven construction field, has been retained, however, by Koppers as a consultant.

Mr. George M. Carvlin, vice-president, engineering and construction division, has been made assistant general manager of that division, according to Joseph Becker, Vice President and General Manager.

Mr. van Ackeren, shortly after graduating from the University of Darmstadt, Germany, as a chemical engineer, came to the United States in 1913 to take employment with Koppers. He started as an operating engineer and successively became assistant superintendent, superintendent, and general superintendent. In 1930 he assumed the position from which he now retires.

Mr. Carvlin was graduated from the University of Illinois with a bachelor of science degree in chemical engineering. He joined the research department of Koppers in 1925. Later he worked in the operating and sales departments, and was made a vice-president in the engineering and construction division in 1943.

Scene in the studio which televizes the new show of Philadelphia Gas Works.

Inghram Heads Construction Of Underground Field

Supervision and management of the construction phase of the $39,000,000 North Oakford gas storage project planned by New York State Natural Gas Corp. and Texas Eastern Transmission Corp. will be handled in the Pittsburgh office of The Peoples Natural Gas Co. by Edward C. Inghram, assistant superintendent of transmission and production, according to John J. Jacob, Jr., Peoples vice-president.

Carl A. Spencer, former Armstrong district superintendent, has been transferred to temporary Greensburg offices to serve as district superintendent of the North Oakford project. John Bailey, former engineer in Peoples Glenshaw division, will have charge of engineering

work in connection with the storage pool development, and Roy P. Swauger has been appointed chief clerk.

The construction phase of the storage expansion program is expected to last three years.

Peoples Natural Gas contemplates transferring certain oil and gas leaseholds and underground gas storage rights which it owns in Westmoreland County to New York State Natural Gas and Texas Eastern. Transfer of the leaseholds and rights is subject to approval by the Pennsylvania Public Utility Commission, and the acquisition of the properties by New York State Natural and Texas Eastern is subject to approval of the Federal Power Commission.

Ultimate objective of the storage program is to provide New York State Natural and Texas Eastern each with a daily delivery of 200,000 Mcf of gas during the five winter months of each year. Gas available to New York State Natural will be sold by that company to Peoples and the East Ohio Gas Co. Gas available to Texas Eastern will be used to meet the winter peak loads of wholesale customers served by that company east of Westmoreland County, Pa.

Other Changes by Peoples

The Peoples Natural Gas Co. has announced appointment of Walter Lowe as supervisor of utilization engineers, and Paul E. Beech as supervisor of dealer relations.

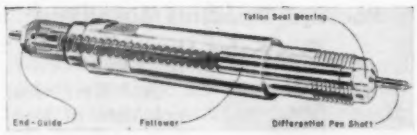
Donald L. Barger has been appointed superintendent of the company's Armstrong field district.

High Pressure Orifice Meter Stuffing Box Developed

A new orifice meter stuffing box, announced by Pittsburgh Equitable Meter Division, Rockwell Manufacturing Co., is said to reduce meter maintenance and leakage troubles at the pen shaft which transmits the motion of the meter's float, and lies between high-working-pressure zones in the manometer and atmospheric-pressure zones in the chart case. It has been shown leakproof at working pressures as high as 5000 psi.

The new stuffing box has a combination packing and bearing machined from a new synthetic plastic, known as Teflon. Teflon is a fluoromethylene polymer which is tough and chemically resistant to water and all reagents (even sulfuric acid) except the molten alkalis. It can take up to 450° F. Other properties of Teflon are its waxy surface (very low coefficient of friction) and its perceptible, but minute, cold flow under pressure.

In the new design a spring-loaded follower sleeve compresses the Teflon bearing in a gland shaped very much like any conventional packing gland. Teflon flows under pressure very slightly—acting in the manner of a packing material and adjusting itself to the stuffing box body and to the periphery of the shaft. This



Outline drawing of new orifice meter stuffing box

Teflon bushing which is tapered at each end may be turned end for end on the shaft and it will still line up, eliminating any bind.

The new principle in stuffing box design eliminates the necessity of lubricant as a sealing medium. Light oil or lubricant, however, can be applied to the shaft and will not harm its performance. Factory tests of this design without lubricant show no leakage under high pressure, and free rotation of the shaft under a torque of only 9.7 inch-grams. More than a year's field testing by several major pipe line companies and oil companies (measuring gas at cycling plants) has demonstrated performances on various kinds of corrosive gases with entrained liquid. At one of these cycling plants the new stuffing box is working at flow temperatures of 200 degrees and working pressure from 3600 to 4000 psi.

More Natural Gas Proposed For Cincinnati Area

Central Kentucky Natural Gas Co., of Charlestown, W. Va., has asked the Federal Power Commission to authorize the construction of pipe line and compressor facilities designed to carry additional natural gas to its wholesale customers in the Cincinnati market area.

The project would increase capacity of the company's system from 191,500,000 cu. ft. per day to an estimated 229,500,000 cu. ft. daily. The additional gas would be received from Tennessee Gas Transmission Co.

Plan for More Natural Gas For Washington, D. C.

Prince George's Gas Corp., of Chillum, Md., has applied to the Federal Power Commission for authorization to build a 20-mile pipe line between Chillum and Rockville, Md., designed to carry additional natural gas to the Washington, D. C., metropolitan area.

The Prince George's company, a subsidiary of Washington Gas Light Co., said the proposed 22-inch line will transport gas to its Chillum compressor station for delivery to the distribution system of Washington as Light and its subsidiaries.

The line, estimated to cost $1,360,000, would connect at Rockville with the facilities of Atlantic Seaboard Corp., Washington Gas Light's present supplier.

Prince George's Gas said that existing lines owned by it and Potomac Gas Co., an affiliate, will have a maximum delivery capacity of approximately 136,000,000 cu. ft. per day during the 1950-51 winter, while the maximum day demand during the coming winter is estimated at 165,400,000 cu. ft. daily with substantial increases each year thereafter.

Calculated ultimate delivery capacity of the Prince George's line is estimated at 122,000,000 cu. ft. per day, the application says.

Blueprint for Chaos?

(Continued from page 13)

Natural Gas Act, as now interpreted and enforced, creates dual regulation . . . with state commissions *subservient* to the FPC whenever any conflict arises between the two?

One of the most chaotic effects of FPC's new power will be the contrast between the FPC method of determining a rate base and the methods of State Commissions.

The FPC method is the *original cost theory* criticized by Justice Jackson. It has been adopted by only seven States. Many States use the prudent investment theory and other States the fair value theory. Ohio uses the reproduction cost method. Some States consider all elements.

It inevitably follows that FPC methods of determining a rate base will differ vastly from those of most State Commissions.

It is obvious that for State Commissions to change their requirements to demand an original cost base would be as devastating a blow as the natural gas distributing business could suffer. Instead, each company probably will be keeping *two complete sets of books.*

Nationally, this will cost many millions of dollars a year. The burden, costwise, will fall where all costs ultimately fall . . . that is, *on the customer.*

Fortunately, we can fight back in this "real conflict" that has been forced upon us. Here is what we can do:

1. *We can vigorously campaign for wider understanding of the basic issues involved.*
2. *We can fight for the right of States and Cities to handle their own affairs.*
3. *We can ask Congress to amend the Natural Gas Act so that its purpose and meaning will be too clear for anyone to misinterpret.*
4. *We can actively support the members of Congress who will take such action.*

The natural gas distributing companies of America and the State Commissions have worked together in solving many problems of great magnitude. Like our other problems, this one must be overcome if we are to serve our communities adequately.

Complete Replacement

(Continued from page 23)

able to secure some butane. We operated a portion of our system, supplying approximately 12,000 customers, on straight butane and air mixture for approximately ten days with no serious results.

After our first winter's operation we noted the action of propane on rubber regulator valve discs, both domestic and distribution regulators and overcame this trouble by switching to leather. After two or three winters' operation we began to notice signs of internal corrosion on our transmission lines which we think could be accounted for by the presence of moisture and oxygen from the atmospheric air we compressed for mixing purposes. We use no drying agent but merely compress atmospheric air and at certain seasons the humidity is fairly high which gives us some free moisture. In order to overcome the difficulties of dust and scale in our distribution systems we have installed oil-bath air cleaners where we ran into difficulty.

After the first two seasons of operation when we corrected the original difficulties in customers' appliances we found we could switch from 100 per cent natural to 100 per cent propane and air with almost no increase in customer complaints, and we are pleased by the fact that after eight years operation that our original experiments have been corroborated by experience.

In the following years, due to the tremendous increase in demand for propane, due to increased usage and shortage of other fuels, and the fact that our location entailed so much elapsed time on car movements from the Mid-continent, we found propane in needed quantities almost impossible to get. Premium prices were being demanded by suppliers as well as year-round contracts with very high load factor clauses. Even if we had gone to the heavy capital expenditure for increased storage in order to comply with year-round load factor clauses, it was even doubtful then whether the shortage of tank cars could be overcome, and sufficient supplies for our needs obtained.

The company, of necessity, started searching for some other high Btu gas for which we could obtain the raw material and which could be substituted for, or satisfactorily mixed with, natural gas. After some considerable study it was decided that a high Btu oil-gas was the apparent answer to our supply problems and the plans were made for building a "Hi Btu" oil-gas plant at Port Stanley, Ontario, in order to take advantage of water transportation. We had no pipe lines to this location but found that the advantages of water transportation overbalanced the cost of laying ten miles of line to connect this plant with our main transmission system.

Actual construction of this plant was started in the spring of 1948 and the first gas was made on November 8. The process used is the twin generator oil gas process of Gas Machinery Co. of Cleveland, who furnished special engineering and equipment relating to the high Btu process. As far as we are aware, this is the first complete plant built from the ground up for the sole purpose of replacing a diminishing natural gas supply. The plant, as constructed, consists of two oil-gas generating sets, with a maximum output of 3,000 Mcf per day each, with the necessary boilers, auxiliary, purifying and compressing equipment. Oil supplies at the time were rather tight and the only oil available to us was a No. 2 uncracked Venezuela distillate of the following characteristics:

A.P.I. Gravity	33.4
Distillation	
I.B.P.	356
10%	424
50%	513
90%	598
F.B.P.	633
Aniline Point	130.2
Pour Point	−55° F
Viscosity, Saybolt	34
Btu per gallon	138,889

This oil showed:

Paraffins	68.8%
Naphthenes	11.2%
Aromatics	12.0%
Olefins	8.0%

Given an analysis of our natural gas, Gas Machinery staff engineers recommended a gas of approximately the following analysis:

Hydrogen	18.5	
Carbon Monoxide	1.1	
Methane	32.9	
Illuminants	24.6	Btu 960
Oxygen	1.7	Sp.g. .740
Carbon Dioxide	4.2	
Nitrogen	17.0	
	100.0	

On November 8, 1948, the plant was started up with a green crew except for the assistance of an operator from Gas Machinery and a gas maker from England who had had some experience with carbureted water gas. We set up a representative sample of appliances in our laboratory at the oil-gas plant and while it was not possible to run as extensive tests as we previously had done with propane and air, without wasting considerable quantities of gas, we were fortunate in starting off with a gas that could be burned reasonably satisfactorily when mixed with a little natural.

Experience in operation gradually helped us to improve the consistency of our output and while customer complaints were higher than normal, I think that in the first winter's operation they could be largely attributed to the fact that with our inexperienced crew, who were composed of local help, we were not able to make a gas of uniform Btu and specific gravity.

We found in this area, as we had previously found in the propane-air situation, that it was desirable to have our appliances adjusted a trifle on the soft side and here again similar difficulties were experienced with burners with large ports and fixed orifices and fixed primary air control. We, in a few instances, ran into flashbacks and yellow tips at the same time in the same area, which indicated that our appliances were not uniformly adjusted prior to the introduction of oil-gas.

This last winter our crew has had more experience and many of the original bugs have been ironed out of our plant and we have been able to turn out a more consistent product, and field experience has shown that the representative analysis as given below works quite well in our appliances as adjusted for natural gas:

Carbon Dioxide	2.8	
Illuminants	24.9	
Oxygen	0.6	
Carbon Monoxide	0.5	
Hydrogen	13.6	Btu 966
Methane	43.8	
Nitrogen	13.8	Sp.g. .707
	100.0	

We have operated this past winter for a period of approximately ninety days with 100 per cent substitute of this gas for natural gas in a considerable area serving seven or eight thousand customers, and in a larger area serving in the neighborhood of 20,000 customers with the introduction of a little natural gas varying from around 15 per cent to 20 per cent. Some of this area was a hundred miles distant from the oil-gas plant.

Our main consideration has been to make a gas that will satisfactorily substitute in our system on appliances adjusted as they are, and, therefore, we have had to overlook high tar and light oil yields, and I rather imagine ours are much higher than are being experienced by the rest of the industry generally. This past winter we have recovered approximately 2.7 gallons of tar and one gallon of light oil per Mcf.

Customer complaints due to operational features of the gas, we consider to be practically at a par with natural. We, however, have had considerable inquiry due to the different odor and appearance of the gas, and have had considerable trouble with regulator valve discs and drying action of the gas on meter diaphragms.

We compress the gas at our plant to between 75# and 125# psig with attendant inter-cooling and after-cooling, which

takes out considerable quantities of light oils, however, there apparently is still enough light oil left in the gas to cause our regulator and meter troubles. We have tried all synthetic rubbers as well as leather, and up to the present writing we still have not found anything that will stand up satisfactorily. Our light oil has a solvent action tending to degrease and dry out any leather and is easily absorbed by any rubber or synthetic rubber compounds causing them to become soft and expand.

We are also concerned about the possible action of this gas on Dresser coupling rubbers and are giving some thought at the present time to some means of taking any remaining fractions of light oil out of the gas.

It has been our experience that both high Btu oil-gas and propane-air can be used successfully for 100 per cent replacement of natural gas send-out and that after a period of correcting any existing poor adjustments or poorly designed appliances, this substitution can be made with acceptable customer satisfaction. It should be borne in mind, however, that these gases have a different odor and different burning characteristics than natural gas which has a tendency to create question in the customer's mind, particularly gas range customers where the flame difference is immediately apparent.

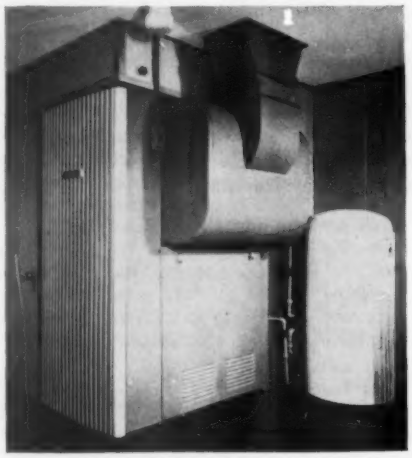
The area we serve has a very active electric competition with probably the lowest rate on the North American continent, and I feel to maintain our cooking load under these conditions, we will have to be eternally vigilant. The modern gas range we find operates quite satisfactorily over a wide range of gravities and heat values, but the old timers will have to be followed up vigorously in order to head off electric competition.

From the point of view of burning characteristics, we favor high Btu oil-gas as it more closely approximates natural gas in specific gravity and burner input; however, it necessitates a considerably greater labor cost than propane and air and the plant is not nearly as flexible in operation.

In plants of comparable size, that is approximately 6,000 Mcf per day capacity, our propane plant can be operated with a total crew of eight men, while the oil-gas plant requires in the neighborhood of 30. The propane plant is much more flexible in operation and can be started up in a few minutes time, and control of Btu and gravity is much simpler. Both plants are suitable only for peak load purposes as we are using a premium priced fuel as our raw material and for permanent extended periods of auxiliary gas, it is my opinion that eventually a low-grade, low-priced raw product such as bunker "C" or similar oil will have to be used for economic reasons. Both of these gases when used for extended periods in high concentration have undesirable effects on regulator valve discs, meter diaphragms, valves and pipe lines.

During the past winter we have used both plants for 100 per cent substitution with some over-lapping in the areas served with no insurmountable difficulties and reasonable customer satisfaction.

Servel Inc. Announces Air Conditioning Drive



New year-round unit

Launching a series of regional meetings to introduce its advertising and promotion drive on year round air conditioning, Servel, Inc., held a combined press and utility showing at a luncheon meeting in New York, June 21.

W. Paul Jones, President of the company, announced that Servel is now beginning volume production of single unit heater and air conditioning units, which have been field tested in actual installations since 1939. There are now 7,000 such units in actual operation in the United States and foreign countries.

The new three and five ton sizes are designed for homes in the $15 to $20 thousand price class and will cost from $3,200 to $5,000 installed, depending on local wage rates and the design of the houses.

Figures compiled by the Brooklyn Union Gas Co., giving total operating costs for a 12 month period, in a six room house heated and cooled by a single Servel installation, were as follows:

October	$ 16.88
November	30.80
December	49.28
January	56.28
February	50.12
March	44.80
April	24.92
May	9.88
June	15.60
July	23.40
August	23.40
September	15.60
Total	$360.96

Dresser Introduces 'Zipcoat' As Pipe Joint Protector

Dresser Manufacturing Division, Bradford, Pa., has announced a new line of products for protecting coupled pipe joints, welded joints, and insulating joints from corrosion:

Zipcoat for couplings is designed to cover and protect a Dresser-coupled joint. Each has a bleeder valve to vent air during backfilling.

Zipcoat for welded joints is for the protection of a circumferentially welded joint.

Zipcoat for insulating joints is similar to the Zipcoat for welded joints, but comes in 10 foot lengths. It eliminates boxing and permits immediate trench backfilling.

Zipcoats are said to have high dielectric strength and give protection that equals or exceeds that of mill or yard-wrapped pipe. Each contains anaerobic microbiological corrosion inhibitor.

Marine Gathering Co. Starts Ocean-Going Pipe Line

The Marine Gathering Co. of Houston was formed in June to construct and operate the world's first ocean-going natural gas pipe line to bring natural gas of the tidelands of the Gulf of Mexico to market in the United States.

Construction of the submarine pipe line under the marginal sea will start early in July. The gas will be obtained from underwater gas wells of the Pure Oil Co. and delivered to the Tennessee Gas Transmission Co.

The pipe line will extend from the coastline of Vermilion Parish, La., 10 miles out into the open and unprotected waters of the Gulf of Mexico to the Pure Oil drilling platform above the Rollover Field 36 feet beneath the surface of the rolling ocean waters. The pipe line will be 8⅝ inches in diameter and have a daily delivery capacity of 50,000,000 cu. ft.

John H. Blaffer, President of the Commerce Oil Co. of Houston, is President of the new firm. G. Burton Liese, Houston investment banker, and Philip C. Dixon, Tulsa oilman, are vice-presidents. The three own the company and constitute its board of directors.

Marine Gathering will construct a separation and dehydration plant on the mainland.

The line is expected to be completed late this Fall.

Mr. Blaffer explained that steel pipe of special specifications will be used to reach into the Gulf and that the pipe line will be buried in a ditch beneath the muddy floor of the ocean through the use of a jet process of underwater ditching. The pipe will also be given special salt water protective treatment, including coating and wrapping.

Robert C. Ledford, former superintendent of the McCarthy Chemical plant at Winnie, Tex., will be operating manager for Marine Gathering.

Pension Plans

(Continued from page 13)

the year, it will result in the largest period of tax-free accumulation.

The above conditions are true in relation to past service contributions. Management may contribute the whole amount needed to cover past service credits at one time or some portion of this amount may be contributed from time to time in conformity with actuarial advice and Treasury Department regulations. If the whole amount is contributed as a lump sum, 10 per cent would be taken as a tax deduction for the 10 successive years. Thus, the fund would accumulate interest tax-free during that time. If a coincident tax deduction is desired, only 10 per cent of total past service credit may be contributed in one taxable year.

The failure to make a contribution during the period in which one is due, under a trust fund, results only in the necessity to make up the scheduled contribution in addition to interest which would have normally accrued at the accustomed rate. Under a plan funded by a group annuity contract an interest penalty would be involved upon reinstatement after failure to pay current contributions.

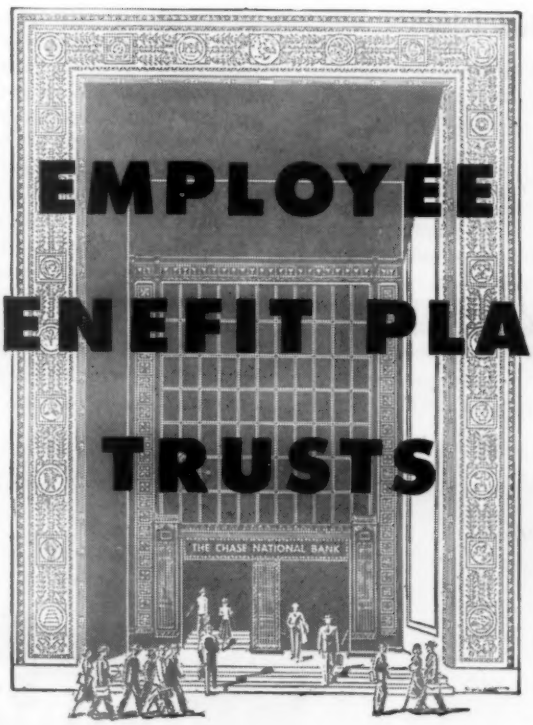
Advocates of the trust method point out that under the trust fund there is more latitude of choice, in the light of changed conditions, to shift from one type of financing to another without consent of a third party.

In summing up conclusions as to the flexibility of the two systems of financing pensions, the trust fund and the insurance method, those favoring the trust method point out that where the plan is an insured plan, the insurance company has a very large measure of control.

Next month's article will be a statement of the case for the insured type of pension and retirement plan and many of the disadvantages of the trust fund method of funding will be indicated by inference.

Bristol Publishes Bulletin On Pipe Line Thermometer

Publication of a six-page bulletin on pipe line recording thermometers for natural and manufactured gas temperatures has been announced by The Bristol Co. In addition to a description of the thermometer, information is given on the specially-designed bulb. The bulletin, No. T843, is illustrated with photographs and drawings showing methods of application, as well as a typical chart record. Copies are available from The Bristol Co., Waterbury 20, Conn.



We invite you to discuss your employee benefit problems with us in the light of current developments.

THE CHASE NATIONAL BANK
OF THE CITY OF NEW YORK

Pension Trust Division

11 Broad Street, New York 15 Telephone HAnover 2-9800

New Law

(Continued from page 32)

tion: When a jury fixes the amount of compensation due a property owner for appropriation of a part of his land for public purposes, shall an additional amount be allowed to cover emergency uses of the land? The answer is no because an emergency cannot be anticipated.

For example, in Rogers v. Tennessee Gas & Transmission Co., 202 S. W. (2d) 737, the testimony showed facts as follows: A gas company condemned a right of way through a farm. The plans for the right of way specified a 50 foot strip of land through the farm for approximately 550 feet. The pipe line was to be constructed and covered with dirt not less than 24 inches deep. The farm owner could therefore plow, plant and cultivate the land on this 50 foot right of way. The jury awarded $399.90 damages to the farm owner. The latter appealed to the higher court asking for a greater damage allowance on the contention that the jury failed to assess damages for "probable" injury in the event an emergency should arise which would necessitate the gas company using the remainder of the land as a means of ingress and egress to its right of way. The higher court refused to increase the damage allowance, saying:

"We think the happening of such an emergency is so remote that it would be impossible for the jury either to anticipate its happening or to determine in advance the extent of damage in the event it should occur. An emergency, by its very nature, is something which reasonably may not be anticipated."

Two Companies Have Easements

According to a recent higher court a gas company's pipe line will be protected against damage irrespective of other holders of easements or mineral rights.

For example, in East Ohio Gas Co. v. James Brothers Coal Co., 85 N. E. (2d) 816, reported February 1949, this question was presented the court: If a gas company has a right of way for laying and maintaining a gas pipe line, and another company has "mineral" rights to mine and remove all minerals from the land, can the gas company prevent damage to its pipe line caused by mining operations? The answer is yes.

In this case it was shown that a gas company had a right of way 15 feet wide through private property. A coal company owned *all* mineral rights on the property. The coal company continued strip mining operations on the land by making excavations nearer to the gas pipe line.

In subsequent litigation the higher court held that since the strip mining would seriously endanger the gas pipe line, cause irreparable injury to the gas company, and seriously interfere with numerous users of natural gas, the coal company will be enjoined from making such excavations and conducting any mining operations which will interfere with or damage the pipe line.

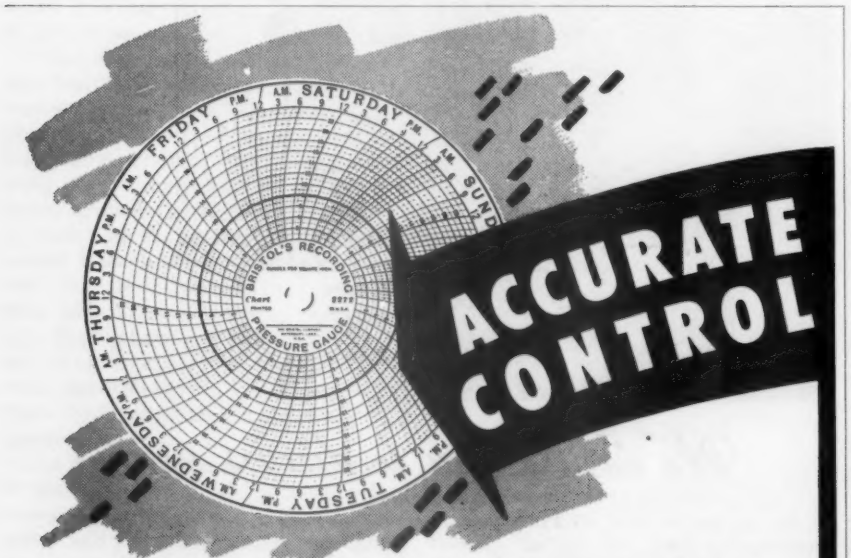
Damage to Unit

An unusually important point of law was decided by a recent higher court involving allowance of double actual damages to appropriate private property.

For example, in application of Great Lakes Co., 211 Pac. (2d) 70, it was shown that a gas company appropriated a strip of land through an 86 acre field. The total area of the appropriated strip was 1.894 acres. The jury awarded the property owner the market value of the appropriated 1.894 acres plus $35.00 per acre of the balance of the 86 acre farm.

The gas company appealed to the higher court contending that the property owner should be awarded only the value of the appropriated 1.894 acres of land. The higher court approved the jury's verdict, saying:

"The jury know that an easement



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MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For horizontal or vertical connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal or diaphragm operated relief valve.

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.
GAS CONTROL SINCE 1892

dividing a tract of land adversely affects its value as a unit."

Engineer's Decision Is Final

Recently a higher court held that a city's officials and engineers may finally decide upon a site suitable for "public use."

For example, in City of Natchez v. Hender, 41 So. (2d) 41, the testimony showed that a property owner, named Hender, sued for a writ prohibiting the city from appropriating his real property. He testified that other sites were available and in fact more advantageous to the city and its inhabitants than the selected site.

During the trial testimony was given that the city engineer had inspected 20 different sites, and that Hender's land was found to be the most suitable for the public use.

The higher court refused to reverse the decision of the city officials to condemn and appropriate Hender's land, saying:

"Much of the testimony for appellee (Hender) was directed to the availability of other sites. A decision by the city that a particular site is best adapted to its proposed public use is legislative and is not reviewable by the courts. It is not to be restricted in its choice between two or more available sites."

PG&E Asks for Rate Increase Of $15,600,000

Increased costs occasioned primarily by importation of natural gas from Texas and New Mexico, a distance of 1600 miles, will require an increase of $15,600,000 in gas rates for northern and central California, effective January 1, 1951, according to an application filed with the Public Utilities Commission on June 7 by the Pacific Gas and Electric Co. The increase will be spread over almost a million customers, and, according to officers of the company, will add less than three cents a day to the average household bill.

Taxes, according to the company, will take 40 per cent of the proposed increase, leaving $9,360,000 as the net addition in revenue to the company.

The company is making an investment of more than $63,000,000 in order to bring this new supply of natural gas into northern and central California.

"The new supply," said W. G. B. Euler, vice-president and general manager of the company, "is urgently needed. The growth of population and industry in northern and central California during the war and since has greatly increased the annual consumption of gas in the PG&E service area. This has resulted in a steady depletion of the gas reserves available to the company in the Rio Vista and Sacramento and San Joaquin Valley fields. In the meantime there have been no new gas discoveries of significance or importance in California.

"Authorizations already received from regulating agencies provide for delivery to the PG&E of 250 million cu. ft. of gas per day from the Permian Basin in West Texas and Southeast New Mexico —150 million daily beginning January 1, 1951, and 100 million more daily beginning January 1, 1952. Applications are pending for an additional supply of 150 million per day, which would bring the daily total to 400 million cu. ft. by January 1, 1952.

"Naturally it costs much more to bring gas 1600 miles from Texas and New Mexico than from nearby California fields. The higher cost must be reflected in consumer rates.

"It is undeniably in the public interest that we import gas from these distant fields; otherwise we will be faced with the necessity of curtailing industrial and other uses of gas and must turn to manufactured gas, which would be far more costly than natural gas."

It is claimed in the application that the company is entitled to a return of six per cent on its investment in properties dedicated to public service. Estimates made in the application show that the rate of return on gas properties will drop to 3.09 per cent in 1951 unless the increased rates are authorized.

ACCURATE · RUGGED · DEPENDABLE

CHAPLIN FULTON MODEL 46

PRESSURE REGULATOR with Dynaknob CONTROL

CHAPLIN FULTON engineers designed this gas pressure regulator—model 46, for accuracy, ruggedness, and ease of maintenance. It covers a wide range of industrial sizes, accurately controlling gas pressure flow from 0 to 48,000 cubic feet per hour. Completely enclosed, no outside connection necessary, this versatile regulator is installed just ahead of the burner orifices, insuring the highest degree of combustion efficiency. Dynaknob control gives a much higher degree of accuracy than has previously been possible to maintain. You can trust your gas pressure regulation problems to this capable and dependable regulator with complete confidence.

CP MFG CO

ACCURATE · DEPENDABLE

Chaplin-Fulton MANUFACTURING COMPANY Pittsburgh 25, Pennsylvania

For complete information write for Bulletin #46

Commercial-Industrial Burner Made by Iron Fireman

A new Iron Fireman commercial-industrial type gas burner makes it possible to automatically fire all sizes of industrial and commercial furnaces and boilers with gas. The new gas burner announced by Iron Fireman Manufacturing Co. will be known as the GCV series and is available in sizes and capacities ranging from a 450,000 Btu input up to 11,520,000 Btu and more.

The new commercial-industrial gas burner comes complete in one assembly, made of manifold, piping, draft box and draft doors. It is installed in the proper location through the door or opening in the ash pit. Burner heads are inserted in the sockets and the area between the burner heads and the sides of the fire box is closed off with a metal plate which leaves one inch clearance around the burner heads.

The burner is said to operate with an extremely low draft. Draft controls are available but not essential, due to the large percentage of primary air entrained through the proportional mixing Venturi tube. When the gas is shut off, the flow of air through the fire box reduces naturally.

No refractory combustion chamber liner is used with the burner.

The burner is designed and built so that various sections of burner heads can be controlled by independent manual or automatic valves. The draft boxes have interior divisions so that each separate group of burner heads has its individual air passage controlled at the front exterior of the draft box by separate sets of air doors. This permits the various groups of burner heads to be operated in proportion to the heat requirements.

Gas Dispatching

(Continued from page 27)

ing the gear train to move the pen arm toward the outer edge of the chart.

When the metal knob is engaged by the cam, the circuit is broken, the electromagnet is de-energized, and the gear train is reversed to start the pen toward the hub of the chart.

The time that the electromagnet is energized determines the reading on the chart. If it is energized one-half the time, the reading will be 250 pounds or one-half the 500-pound range of the chart. Likewise, if it is energized four-fifths of the time the reading will be 400 pounds, the time being governed by the time the metal knob stays in contact with the spiral cam at Call Junction.

With the required pressure readings provided, the Nederland dispatcher's next need is for a means of changing the rate of flow through the regulator as pressure changes become necessary at Call Junction; and this means is provided by the "Ampliset Free Vane Controller" that, in conjunction with a 10-inch Emco regulator and a convential Foxboro motor lever to actuate the flow, has been regularly in service at Call Junction since Feb. 10.

The controller maintains necessary pressure on the motor lever to keep a constant downstream delivery pressure regardless of the volume of gas being delivered. It works on the principle of a wedge shaped piece of metal being moved between two air orifice discharges. As the thicker part of the wedge approaches the orifice, more air pressure is diverted to the motor lever with the additional air pressure serving to cut down the flow of gas, thereby lowering the pressure on the downstream side of the regulator.

This controller is equipped with a motor-driven cam that is so connected to the linkage governing the travel of the metal wedge, that by rotation of the cam the position of the wedge can be changed to raise or lower the outlet pressure of the regulator. Following a change in either direction, up or down, the controller will then automatically hold the new delivery pressure until a further adjustment is made.

The cam in the Call Junction controller requires one hour for a complete revolution. It is so beveled as to require 50 minutes to vary the pressure from zero to 500 pounds, or approximately one minute for each ten-pound change in pressure downstream of the regulator. The motor actuating the cam operates on direct electric current with the switch supplying the current located in the Nederland office.

Since direct current travels only in one direction, the control switch is so connected that throwing it in one direction will cause the motor to rotate to raise the delivery pressure, while moving the switch to the opposite position reverses the motor to effect a cut in the delivery pressure.

For example, if the metameter on the downstream side of the regulator at Call Junction shows a pressure of 260 pounds and the dispatcher at Nederland wants to raise the pressure to 280 pounds, he moves the switch at Nederland, actuating the motor on the controller at Call Junction, to the "raise" position and holds it there for two minutes. At the rate of a ten-pound raise per minute, this gives him the 20-pound raise required.

An outstanding feature of the Call Junction control equipment is that once a setting is made, it is maintained continuously until a new setting is required. The advantage of this lies in the assurance that, in the event of communications interruption, the latest recorded pressure at that point will remain constant until the communications emergency has been removed.

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Atlantic City's Ideal Convention Hotel

Exceptional Convention Facilities adaptable to small, medium or large groups. Ample Meeting, Banquet and Exhibition Rooms. Wonderful location on Boardwalk opposite Steel Pier, the center of Atlantic City. Write Convention Manager TODAY. The Strand features Spacious Colorful Lounges—Open and Inclosed Solaria—Salt Water Baths in Rooms—Garage on premises. Courteous Personnel.

When in Atlantic City visit

FAMOUS FIESTA LOUNGE

"Food for Epicures" Exclusive Penna. Avenue and Boardwalk

East Ohio Gas Goes to FPC With Two Proposals

The East Ohio Gas Co., of Cleveland, has filed two applications with the Federal Power Commission proposing the construction of natural gas pipe line and underground storage facilities in northeastern Ohio.

In its first application East Ohio is seeking authorization to build about 24 miles of line extending from a point of connection near Petersburg, Ohio, with Tennessee Gas Transmission Company's Kentucky-to-Buffalo transmission line, now under construction, to East Ohio's Austintown Station near Youngstown.

East Ohio said the proposed line, estimated to cost $982,565, is required in order to receive additional supplies of gas which it has agreed to purchase from Tennessee Gas. The line will be used to make available a larger supply of gas to meet the demands being made upon its system and will not be used to render any new or additional service.

East Ohio's second application asks authorization for the construction and operation of gas storage inlet and outlet lines in Columbiana, Mahoning and Portage Counties, Ohio, a compressor station in Columbiana County, and the operation of an underground natural gas storage pool in Columbiana County. Estimated cost of this project is $622,700.

CONVENTION CALENDAR

July

11-14 *American Home Economics Association,* Boston, Mass.

July 31—Aug. 3 *Pacific Coast Gas Association,* annual meeting, Seattle, Wash.

September

8 *New Jersey Gas Association,* annual meeting, Spring Lake, N. Y.

14-15 *Mid-West Gas Association,* Gas School and Conference, Ames, Iowa.

17-20 *Controllers Institute of America,* annual meeting, Chicago, Ill.

October

2-6 *American Gas Association,* annual meeting, Atlantic City, N. J.

2-6 *Gas Appliance Manufacturers Association Exposition of Appliances,* Atlantic City, N. J.

16-20 *National Safety Congress and Exposition of National Safety Council,* Chicago, Ill.

20-21 *American Management Association,* New York, N. Y.

23 *Independent Natural Gas Association of America,* Houston, Texas.

Alberta Premier Will Speak At PCGA Convention

Premier Ernest C. Manning of Alberta has accepted an invitation to be the keynote speaker at the annual convention of the Pacific Coast Gas Association on August 1 in Seattle.

N. Henry Gellert, President of the association, and William C. Mainwaring, vice-president of the British Columbia Electric Co., who is the convention program chairman, visited the Premier in Edmonton the last of May and personally extended to him the invitation to keynote the first PCGA convention to be held in Seattle in 13 years.

Mr. Gellert, who is the President of the Seattle Gas Co., also presented Governor Arthur B. Langlie's invitation to Premier Manning to be the governor's guest at the governor's mansion during the Premier's stay in the state of Washington.

Mr. Manning will deliver his address at a large luncheon gathering of executives, and their wives, of gas companies located West of the Rockies, including those of Arizona, California, Oregon, Washington, Utah, Idaho and British Columbia.

Governor Langlie will be the Premier's host during his stay in Washington and will introduce him at the luncheon.

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Reprints of:

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An eight-page reprint from the May issue of American Gas Journal, with a two-page table "Natural Gas Reserves, Production and Consumption, from 1906 to 1950."

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Gas Distribution Systems

(Continued from page 22)

opening approximately two feet long, and inserting the flat steel wire at one opening and applying air pressure at the other end. The wire is twisted or turned as it is forced into the main. The air pressure finally will break through and clear the dust and dirt from the main.

This process is repeated as often as is necessary to clear the entire section of the main involved. After the work of clearing is completed, the section of main removed must be replaced. Dresser couplings are used for this purpose, the main purged, gassed, and service restored to customers whose meters were turned off at the beginning of the job.

This explanation of the work involved, in connection with these three types of service stoppage, was intended to spotlight the effect of the rapid increase of this type of distribution trouble on "customer relations" and on maintenance and operating budgets.

It was evident that immediate steps must be taken to start some form of a survey to ascertain where the bad spots are located, and what must be done to change the trend from an increase to a decrease and eventually approach elimination.

A study was made of the high and medium pressure systems and it was finally decided to divide the entire layout into sections or localities, depending upon the gas supply. Four hundred feet to the inch maps were made of each of the sections and the exact main layout shown on them along with the pipe size and the year it was installed. This done, the location of each seal blowing, each dust stoppage, and each leak was spotted on the maps. Different symbols were used for each type of trouble and different colored pencil used to designate the year. The maps are brought up-to-date monthly. Our completed order file supplied us the data for the two years previous to the start of the survey.

A pattern or picture began to take form immediately on the map of each section of the layout. These patterns or pictures were similar to each other in every case and gave us the story as to why the size of the mains, and their layout, was sufficient unto themselves over a period of years, but which were very much lacking when the increased dust deposit and increased gas demand combined to overload their remaining capacities.

One section can be taken as typical of each of the sections into which the system was divided. A page showing the main map covering this section is included. It was found that in this case there were seven gaps existing in the main system, and that but a relatively small amount of pipe would be required to fill in these gaps. Some of the gaps occurred in mains which should be trunk mains, others where the mains involved should be part of a belt system.

On one street where the main acted as part of the supply to the section, the pipe was 1¼-inches in diameter and installed in 1901. Numerous other sections of main were installed previous to 1910. Some maps showed ¾-inch, 1-inch, and 1¼-inch mains installed previous to 1900. The leaks, as could be expected, showed up most frequently on the older mains. The service and main stoppages occured most frequently on dead end mains, that is, on mains not having a supply from both directions. The blowing seals, also, were most apparent on dead end mains, but were also very frequent on mains where the gas velocity, out of necessity, had to be very high.

Well, there you have a clear picture of some of the major causes of trouble in our high and medium pressure systems. What is the answer? What is the remedy? Perhaps on first thought, the reconditioning of this type of system will seem easy. Simply fill in the gaps with additional mains, clean out all dead end mains which cannot be tied into adjoining main, replace all mains under 2-inches in

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diameter, replace all mains over 40 years of age, install additional supply or feed mains where needed, increase the size of the mains that bear evidence of being overloaded, and the job is done.

Yes, this does look easy when we consider the picture of just the one section of the distribution system which we have been inspecting. But, combine the several sections that go to make up the entire system and we have an entirely different story. The cost of the overall project adds up to an amazingly large figure and when added to the normal expenditures required for system reinforcement, replacement of worn-out mains, replacement of mains ahead of paving, work required ahead of highway improvements, and we end with a budget figure which management just cannot authorize. There isn't that amount of money available.

Carboseal or other agent is not a cure-all and is of little help under these conditions. It is not advisable to carboseal mains smaller than 2-inches in diameter as it creates a moist, heavy obstruction that causes more trouble than the dry dust and dirt. The supply mains, 4-inches and larger, were treated with carboseal with relatively good results in the immediate vicinity but this is not the answer to the problem.

Our next best bet, then, seemed to be to pick our bad spots and list them in some order which would show us where we could spend the least money and do the most good, that is, grade each improvement which we felt was advisable to make in the order which we considered was of greatest importance. This done, our survey of this type of distribution system was complete except for keeping it up-to-date. The actual reconditioning of the system was started, and money authorized and spent, according to the schedule. The plan of improvements as it was worked out covered four to five years and it is now planned to keep the schedule at least that far ahead of the actual work completed.

Results do not show up rapidly but are very apparent as between 1942 and 1946 the overall number of blowing seals increased just over 33 per cent. The service stoppages increased 21 per cent. During 1947, 1948, and 1949, the individual sections of the system in which we concentrated our efforts showed a decrease of 51 per cent from the 1947 level in blowing seals, and a decrease of 12 per cent in service stoppages.

Undoubtedly, the most important lesson which our distribution troubles over the past few years has taught us is the value of keeping accurate records and making continuous studies and surveys of the troubles as they occur.

Otto C. Mauthe Dies

Otto C. Mauthe, manager of publications for the Southern California Gas Co., died on June 25 in Los Angeles.

Mr. Mauthe first became affiliated with the gas industry in 1933 when he was placed in charge of press relations for the Los Angeles Gas and Electric Co. Shortly after the merger of LAG & E and the Southern California Gas Co., he was appointed manager of publications, which post he held at the beginning of his illness in June 1949.

Born in Shreveport, La., in 1905, Mr. Mauthe attended the University of Oregon. Upon graduation he settled in San Francisco where he worked for the McCormick Steamship Lines and the *Wall Street Journal*.

Flexible Rubber Pipe Bulletin Issued

The Hewitt Rubber Division, Hewitt-Robins Inc., has just issued an 8-page bulletin explaining the applications and comparative qualities of flexible rubber pipe as against metal pipe in many services, exclusive of long lines.

Case histories and recommended applications are given. Copies of Bulletin No. H-1 are available by writing to Hewitt Rubber Division, Hewitt-Robins Inc., 240 Kensington Ave., Buffalo 5.

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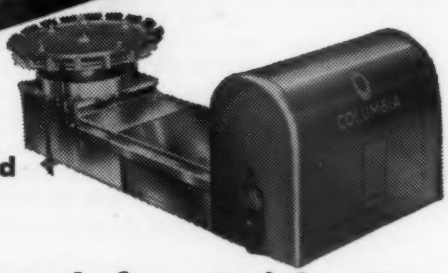

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Inter-Industry Fuel

(Continued from page 14)

already in many localities gas is cheaper than coal. With coal prices held up, and gas prices held down, what becomes of the market?

Two evils are inevitable—one is that the coal market will simply cease to exist wherever gas can be had, and the other is that gas will be sold for inferior uses in processes where coal could just as well and perhaps should handle the load.

After all, we realize that the market place supplies the final answer to whether or not production is profitable. The only reason for production is consumption. If coal in solid form is not marketable, then it is up to the coal industry to discover ways and means of moving their Btu's to the consumer in some other form—in the gaseous state through the very pipe lines that now carry natural gas, perhaps.

These things can be done, and much of the technical research required has already been completed. It still remains to reconcile the costs with the ability and willingness of the market to pay those costs.

The refining and marketing branches of the oil industry are concerned about their markets for kerosene and fuel oils. But here again processes are technically improved to the place where high Btu gas made from oil can already compete with natural gas in some areas. But to bring these processes into reality requires oil industry cooperation too. The price of fuel oil must be stabilized to a greater extent than it has been in the past. Before any company can economically justify a high Btu oil gas plus natural gas program, it must have some knowledge of what its oil for gas making purposes is going to cost, over a period of years. No regulated utility would think of switching to a straight natural gas or a mixed gas program without having first negotiated a contract with the supplier that would guarantee its costs over an extended period. How can we expect a utility to make the investment required in a modern high Btu oil gas process for peak load, standby, or firm load unless it can predict its oil costs as accurately as it now can foresee the city gate prices for natural gas?

We too must proceed to reconcile our own operations with the new spirit of the times. The first thing that we have to do, it seems to me, is adjust our public relations program so that we cannot again be made a pushover for misrepresentation such as was foisted off on the public with respect to the Kerr bill.

We should establish and maintain a central economic research council that the entire industry could look to for a disinterested scientific appraisal of our position with respect to the national economy whenever controversial questions arise. Certainly the work of such a body would be most effective if it worked in cooperation with representatives of both the coal and the petroleum industries.

We should cooperate intelligently, and as a unit, with all of the existing agencies of regulation that fear greater federal encroachment. That includes the Interstate Oil Compact Commission, the National Association of Railway and Utility Commissioners, the conversion bodies of the producing states, as well as the regulatory commissions of the gas consuming states.

Our gas transmission expansion programs must be tempered with great consideration for the type of market to be served, and not just conceived in terms of estimated gross consumption. Whether we like it or not, gas is being restricted more and more to the so-called superior uses by Federal Power Commission regulations and certificate conditions. We might as well recognize that and not batter our heads against a stone wall.

In the cultivation of the consumer market, the distribution utilities must also adjust their thinking to new conditions. Load building is important, but *load balancing* is now the real key to successful operation. Thus the type of load taken on with a new natural gas supply becomes of great significance. Under present conditions it is easy in many areas to take on so much new house heating that it could prove economically disastrous in the seasonal and daily peaks that would thus be created. Off-peak sales of gas in profitable commercial, process industrial and domestic brackets, and not dumped for boiler fuel, must be cultivated. Some of these things imply a new approach to the whole merchandising problem of the distributing utilities.

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New Garland Fry-top Range

Production of a new Garland fry-top range has been announced by Detroit-Michigan Stove Co.

The new model has increased frying area for greater frying capacity. The frying surface itself slopes slightly toward a new drain channel which extends across the front for drainage. There is also a grease container which attaches to the front of the range and lifts off for emptying of grease. The frying surface has new higher edges to help reduce spill-overs.

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Elert and Barrows Promoted By Detroit-Michigan

Promotion of M. W. Elert to assistant sales manager of Detroit-Michigan Stove Co., and the appointment of E. C. Barrows to succeed him as advertising manager was announced recently by John A. Fry, President.

Management Must Have

(Continued from page 30)

recent record of the gas companies in this respect. In the first five months of this year they sold only $24 million of common stock and raised but 14 per cent of their new capital needs in this manner. This is a showing only two-thirds as good as the none-too-impressive record established by the utility industry as a whole.

This record appears to be all that is needed to point up the problem which utility managements have encountered in their search for capital to finance their sharp expansion of facilities required to provide for soaring and as yet far from satisfied demands for service.

The small part of new money raised through sale of common stock is due, according to most interested observers, to a 'shortage' of equity capital.

An opposite trend of thought now is forming in one well-known section of the investment world, the belief being that there is not any real shortage of equity capital, rather a shortage of capitalists.

As proof of this it is pointed out that of the 50 million families in America, only six million own investments.

"Equity capital has not been flowing through normal investment channels at the rate that our wealth and industrial activity should justify, but it can be made to flow," Winthrop H. Smith, managing partner of the investment firm of Merrill Lynch, Pierce, Fenner & Beane, told the American Management Association last month.

Mr. Smith's firm, it might be pointed out, has done an outstanding job among investment firms in sponsoring widespread public ownership of common stocks.

He pointed out that gross personal savings today are running close to $12 billion annually and that available savings which could be utilized for investment now are about 20 times the amount of money actually raised through sale of common stock in 1949. As a result there is more money available for investment today, in terms of national size and wealth, than ever before in history.

These potential investors comprise chiefly relatively small wage earners whose knowledge of investments either is non-existent or very limited. It is the combined job of management and of the investment firms, Mr. Smith points out, to undertake a program of educating these would-be investors and to dispel their ignorance of investments as expressed in their own statements that stocks are too risky a vehicle.

A factor very often forgotten in getting new equity capital, he states, is that management has to ask investors for money before it is to be forthcoming. The request must be on a realistic basis and management must remember it has to compete for these available funds with all other segments of the American economy.

As the writer has pointed out in previous issues of AMERICAN GAS JOURNAL it is management's responsibility to give potential investors all the information there is to know about the company. Where this is done and the outlook is clear, the utility company has no difficulty in raising its needed funds by the equity capital route.

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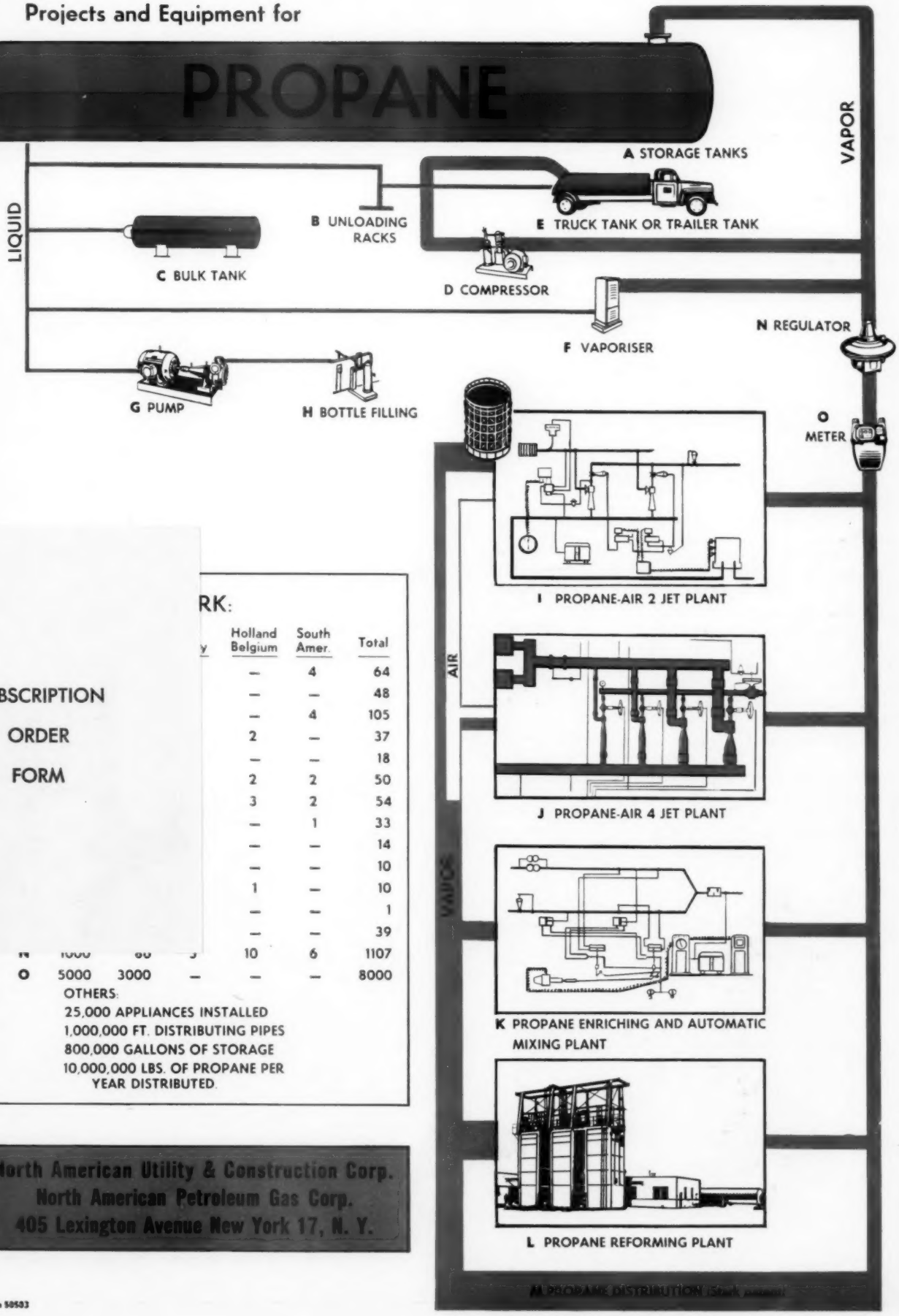

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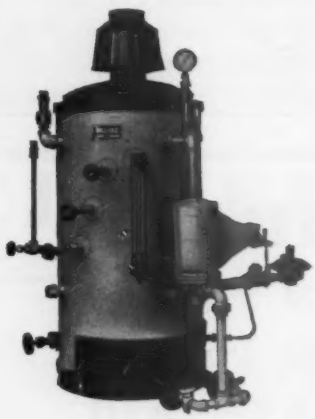
Robertshav
Safety Gas
Semet-Solv
Allied C
Servel, Inc
Skinner Co
Sprague M
Stacey Bro
Division
Stacey Ma
Stewart W
Superior
Thomas &
Tri-State
United En
Vulcan Ru
Wachs Co., E. H. ..... —
White, Weld & Co. ..... —
Whittington Pump & Engineering Co. ..... —

LATTNER
GAS BOILERS
1 H.P. to 45 H.P.



2 H.P. Gas Fired Pressing machine boiler. 100 lbs. ASME Code.

P. M. LATTNER MFG. CO.
CEDAR RAPIDS, IOWA

GOODMAN
USED SINCE 1897
"Z" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

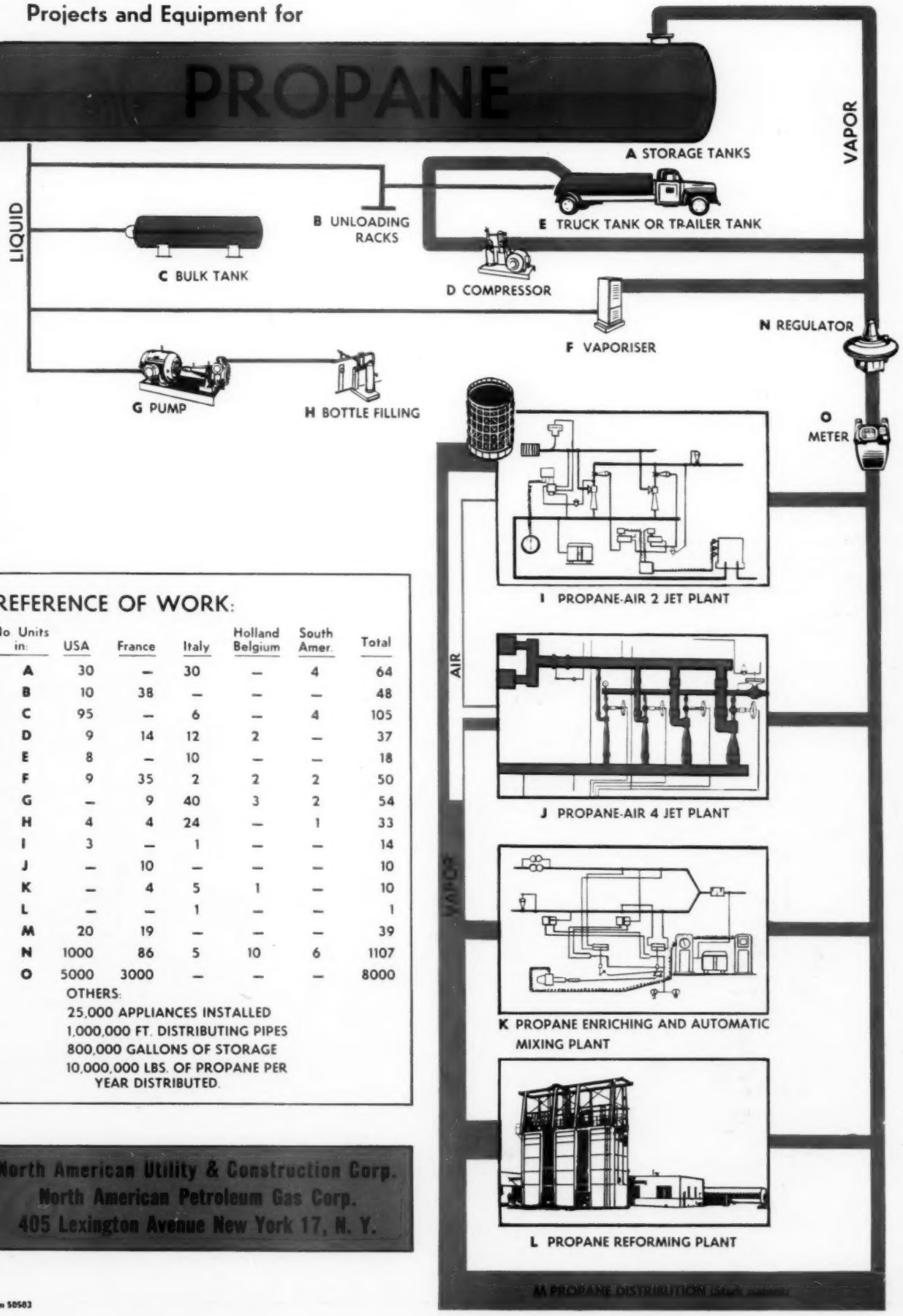
Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

Projects and Equipment for

PROPANE



REFERENCE OF WORK:

No. Units in:	USA	France	Italy	Holland Belgium	South Amer.	Total
A	30	—	30	—	4	64
B	10	38	—	—	—	48
C	95	—	6	—	4	105
D	9	14	12	2	—	37
E	8	—	10	—	—	18
F	9	35	2	2	2	50
G	—	9	40	3	2	54
H	4	4	24	—	1	33
I	3	—	1	—	—	14
J	—	10	—	—	—	10
K	—	4	5	1	—	10
L	—	—	1	—	—	1
M	20	19	—	—	—	39
N	1000	86	5	10	6	1107
O	5000	3000	—	—	—	8000

OTHERS:
25,000 APPLIANCES INSTALLED
1,000,000 FT. DISTRIBUTING PIPES
800,000 GALLONS OF STORAGE
10,000,000 LBS. OF PROPANE PER YEAR DISTRIBUTED.

North American Utility & Construction Corp.
North American Petroleum Gas Corp.
405 Lexington Avenue New York 17, N. Y.

Form 50503

Adaptable!

Inches to Inches

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Pounds to Inches

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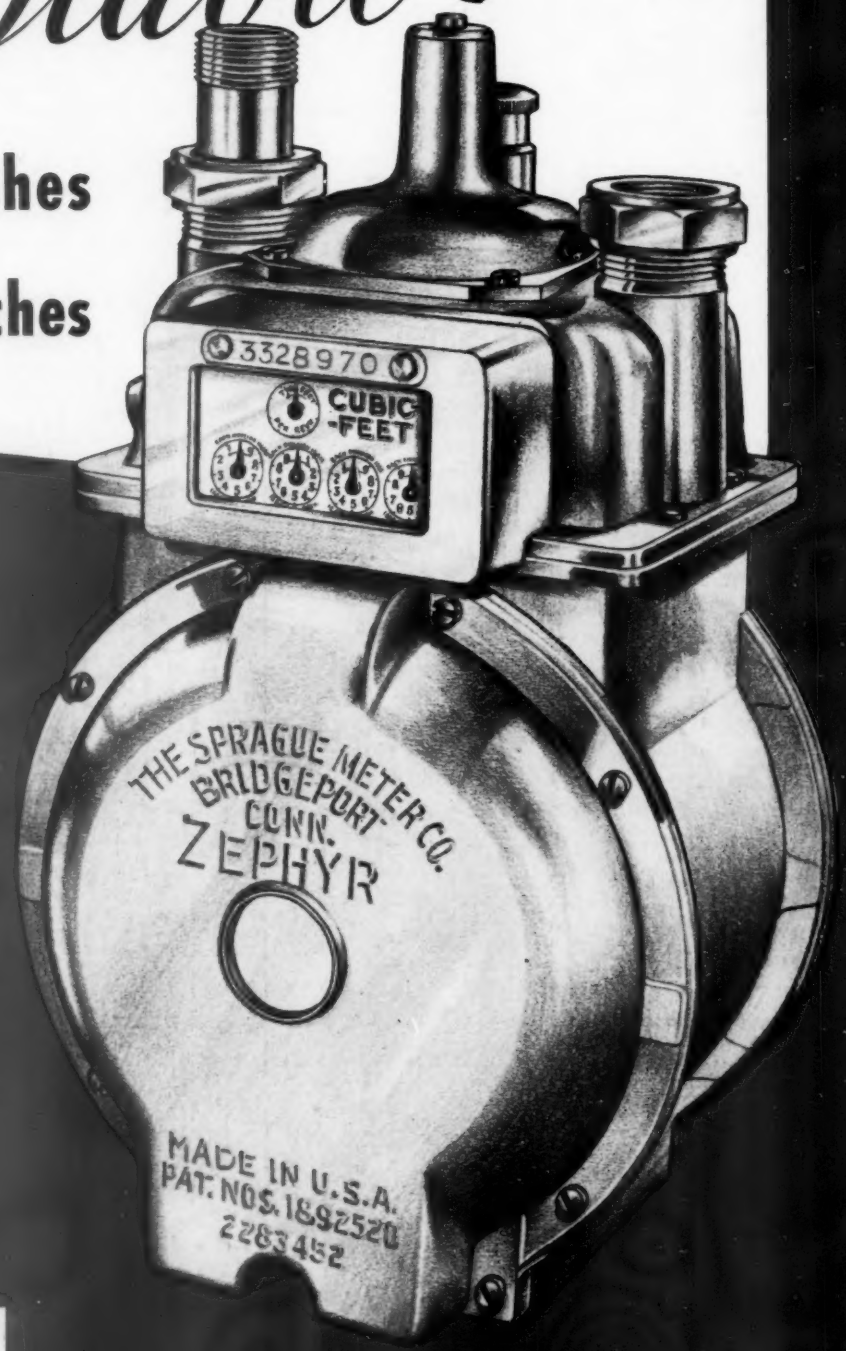
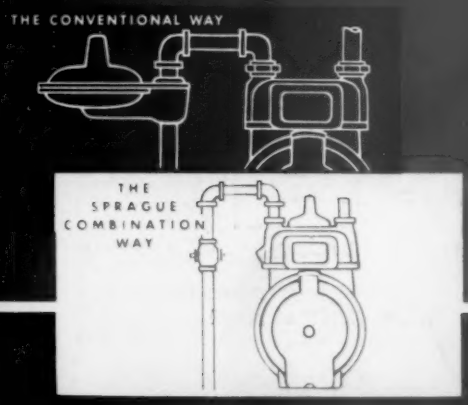


SPRAGUE COMBINATION METER and REGULATOR UNIT

Available in two sizes number 1A and number 2



THE SPRAGUE METER COMPANY

BRIDGEPORT CONNECTICUT